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Kansas Entomological Society
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NOTES AND DESCRIPTIONS OF NORTH AMERICAN TEPHRITIDAE[1] (DIPTERA)

BENSON F. QUISENBERRY
Oklahoma A. and M. College, Stillwater.

The new species described here were discovered by the author while studying the tephritid material in the Colorado A. and M. College Collection.

Chaetostoma elizabethae, n. sp.
(Fig. 1-2)

Male and Female: Rather shiny, entirely yellowish brown, paler on face, cheeks, upper portion of postnotum and tibiae and tarsi of fore and middle legs. All bristles and short setae black except short yellowish setae of tibiae and tarsi of fore and middle legs, and a patch of fine, long, white setae on propleura. Head thinly covered with white pollen. Front rather narrow, sides nearly parallel, tapering slightly at base of antennae, with a few short, erect, brown setae. The two pairs of reclinate upper frontoorbitals set in short, narrow, shining stripes which extend anteriorly, on either side, from vertex. Lunula nearly white. Posterior orbits with greenish tinge. Second segment of antennae marked with blackish on lateral margins and with a conspicuous rather long median seta; third nearly twice as long as wide, tapering to rounded apex; arista black, yellowish at extreme base. Proboscis short and broad; short setae of palpi mostly restricted to tuft at apex.

Mesonotum 2.10-2.60 mm. long. Entire thorax very thinly covered with a white pollen which is denser on posterior region of mesonotum. Mesonotum marked with a short black stripe on either side and three black, narrow, median ones; the short lateral stripes extend posteriorly from transverse suture and join adjacent median stripes, on each side, to form V-shaped marks at base of intraalar bristles. Anterior pair of dorsocentrals set very slightly ahead of a line drawn through supraalars in the male and slightly behind in the female. Lower portion of postnotum nearly amber colored.

Femora thinly whitish pollinose, fore pair with a row of long bristles ventrally, hind pair with a few subapical dorsal setae. Hind tibiae with a rather dense row of short setae.

Wings hyaline with brown bands. Stigma yellowish except at extreme base. First and third veins setose, those on latter reaching slightly beyond anterior crossvein. Length 4.28., width 2.11 mm. Halteres whitish.

Abdomen marked with blackish on first two segments. Setae much longer on lateral and posterior margins of first four segments; last segment bristly on posterior margin. Ovipositor sheath short and broad, less than

[1] The writer wishes to extend his sincere appreciation to Dr. M. T. James for his helpful suggestions in the preparation of the manuscript.

the length of preceding segment, convex dorsally, tapering slightly to apex. Venter thickly cinereous pollinose on anterior three sternites.

Type Material: Holotype male, and allotype female, Northern Colorado, April 24, 1898; paratype, female, Loveland, Colorado, May 14, 1913 (G. P. Welden); holotype and allotype in Colorado A. and M. College collection, paratype in the United States National Museum. Data from the Colorado A. and M. collection catalogue, in agreement with the above dates and probably referring to the lot from which the holotype and allotype came, indicate that they were collected at Fort Collins by C. P. Gillette.

The species described here agrees in all respects with the diagnosis of the genus as given by Hendel[2] except that the bristles on the cheeks of **elizabethae** are somewhat shorter and more numerous than those of the genotype. The wing pattern of **elizabethae** is remarkably like that of **giraudi** but differs principally as follows: the brown band crossing the middle of the wing originates on the costa apicad of the stigma, the second brown band which crosses the wing over the posterior crossvein is complete and not broken in the first posterior cell, and the stigma is wholly yellowish except for the extreme base. To the authors knowledge, this is the first record of this genus for North America.

Neaspilota viridescens, n. sp.

(Fig. 5)

Female: Head mainly pale yellow, whitish pollinose. Front brownish except lateral margins, at vertex slightly wider than half of maximum width of head, whitish lateral margins with a few fine white setae. Three pairs of converging lower frontoorbitals, one pair diverging and one pair converging upper frontoorbitals. Postverticals and occipital row white, all other bristles brown. Center of occiput reddish, that color extending in a broad stripe on either side to lower posterior corners of cheeks. Orbits and sides of occiput dark green. There is a fringe of short, fine, black hair immediately above the occipital foramen. First and second segments of antennae yellow, former with white and black setae intermixed, latter with black setae and a blackish dorsal spot; third clay yellow, one and one-half times as long as broad, upper anterior corner subacute; arista black, light brown at thickened base. Face concave, whitish pollinose. Cheeks one-fifth height of eye, with a mixture of short black and white setae anteriorly, white setae on posterior margin rather long. Oral cavity large, drawn up anteriorly and projecting. Proboscis stout, yellowish brown, labella with rather long fine brown setae; palpi whitish yellow, with a mixture of black and white setae, the former restricted to apex.

Mesonotum 1.50 mm. long, mainly black, a large prescutellar spot and the broad lateral margins greenish yellow. Black of mesonotum largely obscured by whitish pollen. A spot above the neck shining. A black spot obscured by whitish pollen, on each sternopleuron and hypopleuron. Posterior borders of mesopleura and pteropleura marked with brown. The short setae fine, white and densest on pollinose areas. All bristles brown,

[2] Hendel, F., Die fliegen der palaearktischen, Trypetidae 49, p. 81, 1927.

those on pleural regions somewhat paler. Scutellum pale green, with four strong bristles. Upper portion of postnotum pale yellow, the lower black, thickly covered with cinereous pollen.

Legs clay yellow. All femora and hind coxae and tibiae marked with brown, latter with fine white pollen. All bristles and short setae black except a few white setae on outer side of fore femora and scattered white setae on hind tibiae.

Wings hyaline except for dark markings which are as follows: a pale yellowish cloud on humeral crossvein; grayish tip of costal cell; stigma with basal two-thirds black, tip yellowish; marginal cell with a narrow pale grayish spot bordering stigma, apical one-third gray, that color extending narrowly below the second vein; submarginal cell with a gray spot crossing cell at apex of second vein and another very pale gray spot filling angle formed by third vein with margin of wing; both anterior and posterior crossveins bordered with gray. Veins on apical half of wing and including both crossveins black, those on basal half ranging from pale brown to yellow. First vein setose. Length 3.42 mm., width 1.46 mm. Halteres pale yellow.

Abdomen yellowish brown, thinly covered with white pollen. Dorsum with brownish black irregularly placed marks. The short setae mainly white, intermixed with brownish on last two segments, longer setae on posterior margins of last two segments brownish. Ovipositor sheath approximately 1.40 mm. long, yellowish brown, darker on basal two-thirds, tapering apically, covered with short black setae. Venter yellow, with black setae.

Type Material: Holotype, female, Rabbit Ears Pass, Colorado, June 26, 1946 (M. T. James), in the Colorado A. and M. College collection.

In the Malloch[3] and Benjamin[4] keys this species traces to **vernoniae** and **achillae**, differing from both of these species in addition to characters indicated in the key, in the broader, less tapering front, the more extensive dark coloring of the stigma, the dark dorsal markings of the second antennal segments, and in wing markings as shown in the figure; in addition it differs from **vernoniae** in the presence of black markings on the sternopleura and pteropleura.

The following key was adapted from that given by Malloch and will serve to distinguish the known species of **Neaspilota.**

KEY TO THE KNOWN SPECIES OF NEASPILOTA

1. Wing with several dark marks in addition to the one in the stigma 2
   Wing with at most the stigma distinctly blackened, no dark clouds through or in the other cells though sometimes the crossveins may be darker than connecting parts of the longitudinal veins 4
2. No distinct black mark on lower half of sternopleura or on the center of the anterior margin of the thorax..... **vernoniae** (Loew)
   Lower half of the sternopleura and a mark in center of the

[3] Malloch, J. R., Proc. U.S. Nat. Mus., 92 (3133): 18, 1942.
[4] Benjamin, F. H., U.S. Dept. Agric. Tech. Bul., (401): 36, 1934.

anterior margin of the thorax black 3

3. Hairs on dorsum of the abdomen dark or black; a more or less complete fascia from the costa, before the apex of the second vein, extending over the posterior crossvein ..... **achilleae** Johnson

Hairs on dorsum of abdomen wholly whitish except some brownish intermixed on last two segments; no fascia extending from costa over the posterior crossvein ..... **viridescens** new species

4. Hind tibiae of the male with two minute erect stiff hairs at the apex on the anteroventral surface that project downward, the hind femur in same sex without erect hairs on the ventral surface, mid femur with short fine erect hairs basally; stigma of wing in both sexes with a distinct dark spot in basal third ..... **punctistigma** Benjamin

Hind tibiae of the male without any short erect hairs at apex of the anteroventral surface; other characters not as above 5

5. Hairs on the dorsum of the abdomen except those on the basal compound tergite dark brown; stigma yellowish brown, usually paler behind; mid and hind femora of the male without erect outstanding ventral hairs; wing veins brown except at bases; interocellar region infuscated ..... **albidipennis** (Loew)

Hairs on the dorsum of the abdomen yellow; other characters not as above 6

6. Stigma entirely yellowish hyaline, and the veins entirely pale yellowish 7

Stigma entirely or basally browned or infuscated, the crossveins and a short section of the connecting veins each side of them usually darker than the central portions of third and fourth veins; (mid and hind femora of the male not furnished with outstanding ventral hairs) 8

7. Mid and hind femora of the male with some fine outstanding hairs on the ventral surfaces, most noticeable basally; the series of minute setulae on the anterodorsal surface of the hind tibia practically undeveloped; stigma of the wing narrow ..... **dolosa** Benjamin

Mid and hind femora of the male without erect fine ventral hairs; the series of minute anterodorsal setulae on the hind tibia well developed; stigma wide ..... **alba** (Loew)

8. Stigma fuscous or brownish yellow on basal third or more, and the crossveins darker than the greater portion of the longitudinal veins; a slight dark cloud at base of the costal cell; the anterodorsal series of minute setulae on the hind tibia rather inconspicuous and not closely spaced ..... **signifera** Coquillett

Stigma almost entirely fuscous or brown, paler behind; hind tibia with the series of anterodorsal setulae stronger and more closely placed ..... **brunneistigma** Doane

Paroxyna distincta, n. sp.
(Fig. 4)

Female: Head mainly yellow, whitish pollinose. Frons at vertex 0.45 maximum width of head, longer than wide, sides tapering but slightly to base of antennae. Frontale yellow, with a patch of very fine setae anteriorly. Parafrontals whitish, nearly gray at region of upper frontoorbitals, with conspicuous white setae. Lower frontoorbitals, ocellars and inner verticals black, all other bristles white (anterior pair of upper frontoorbitals broken off). Occiput and ocellar triangle black. First and second antennal segments pale yellowish, with white setae (third segment missing). Face, parafacials, lower eye margins and palpi whitish. Face receding slightly. Oral margin projecting but slightly anteriorly. Proboscis yellow, slender, the labella elongate.

Mesonotum 1.40 mm. long. Thorax black in ground color except for pale yellow apical half of scutellum, densely whitish pollinose. The short setae white. Posterior notopleural, stenopleural, pteropleural and mesopleural whitish, all other bristles black.

Legs wholly yellow, thinly whitish pollinose. The setae on coxae, upper side of fore femora, basal two-thirds of middle femora and on basal half of hind femora whitish, the long setae on ventral side of fore femora and that on remaining leg areas yellowish brown except for a few very short black ones on tarsi.

Wings subhyaline with brown reticulation. Stigma wholly brown, rather long and narrow. Marginal cell with two large subhyaline spots between apices of first and second veins. Anterior crossvein situated more than twice its length from posterior crossvein. First vein setose, third bare. Length 3.10 mm., width 1.23 mm. Halteres yellow.

Abdomen black, whitish pollinose. The short setae white. Ovipositor sheath shining black, two and two-thirds as long as preceding segment.

Type Material: Holotype, female, taken between Cerro Summit and Cimarron, Colorado, August 21, 1896 (C. P. Gillette), in the Colorado A. and M. College collection.

Allied to **dupla** Cresson, but the absence of the thoracic stripes, wholly yellow legs, less approximate anterior and posterior crossveins and the position of the large hyaline spots in the marginal cell will serve to distinguish this species.

Paroxyna coloradensis, n. sp.
(Fig. 6)

Male and Female: Frons at vertex 0.52 as wide as maximum width of head, tapering to antennal bases, wider than long. Frontale yellowish brown, bare. Parafrontals very narrowly whitish, with fine brownish setae. Ocellar triangle and occiput black, that color extending onto cheeks nearly to center, thinly cinereous pollinose. Lower frontoorbitals, lower pair of upper frontoorbitals, ocellars, inner verticals and the occipital fringe black, all other bristles whitish (in the female two strong and one weak lower frontoorbitals, on the left side the weak one is placed between the strong

pair, on the right side the weak one is placed anteriorly). Antennae yellowish, tinged with brown, first and second segments with black setae, third about 0.66 as wide as long, the upper anterior corner somewhat rounded; arista black. Face, parafacials and cheeks whitish, tinged with yellow. Cheeks slightly over one-third eye height, with short black setae anteriorly. Palpi yellowish, with the usual blackish setae at apex. Proboscis yellowish brown, labella elongate, with fine white setae.

Mesonotum 1.40 mm. long. Thorax black in ground color and with pollen as follows: brownish, with some cinereous intermixed on disc of mesonotum and extending down on either side to include the notopleura; a brownish spot on upper portion of mesopleura; brownish on scutellum; extreme anterior margin of mesonotum, all of pleural regions except as noted above, and postnotum cinereous. Mesonotum with the following shiny brownish areas: a median stripe and one on either side running posteriorly over both pairs of dorsocentrals; a stripe on either side from transverse suture running posteriorly to the intraalars; a spot at the presutural bristle. The short setae on notum mostly black with some whitish intermixed, that on scutellum nearly wholly whitish. Pteropleural bristle, short setae on lower portion of sternopleura and a few on lower portion of mesopleura whitish, all other bristles black.

Coxae and femora except apices of latter, black, cinereous pollinose; in the female the fore coxae are marked with yellow laterally. Tibiae and tarsi yellowish in female, reddish yellow in male except for the blackish two-thirds of the hind tibiae. The longer setae of the coxae whitish, the short ones black. Bristles on ventral side of front femora and the short setae on remainder of legs black except that of tarsi which is golden.

Wings with a dark brown pattern in the male and nearly slate colored in the female except for stigma and adjacent portion of marginal cell. The spots are subhyaline, small and comparatively few and indistinct. Stigma of female with a small subhyaline spot. Length 3.42 mm., width 1.46 mm. Halteres pale yellow.

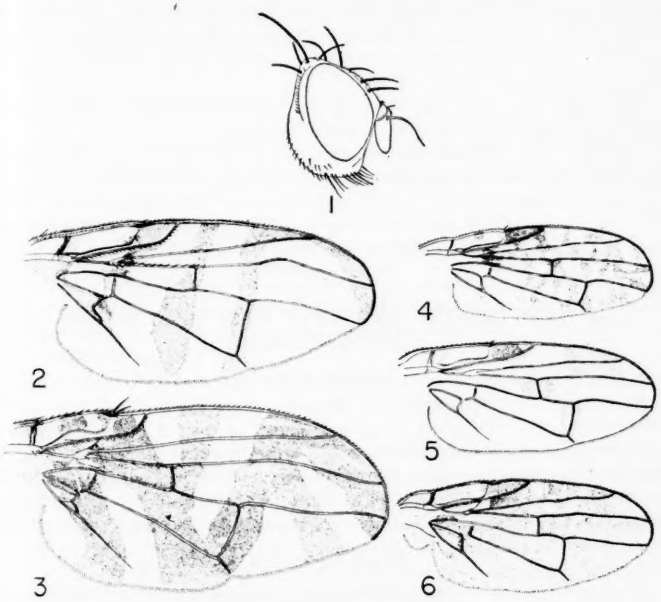
Abdomen black in ground color, cinereous pollinose. Dorsum with two broad, shiny, longitudinal stripes that leaves only a narrow central stripe and lateral margins unmarked. The short setae mainly whitish with some black intermixed which is most noticeable on last segment. The longer setae on posterior margin of last segment black. Ovipositor sheath shining black, with fine dark pubescence, tapering apically, as long as preceding three segments. Venter with mostly black setae on posterior two sternites, that on preceding ones whitish.

Type Material: Holotype male and allotype, female, Gould, Colorado, near Cameron Pass, August 19-21, 1940 (M. T. James); in the Colorado A. and M. College collection. Two specimens in poor condition, same data as type, are apparently conspecific with above type series.

This species appears to be closest to **snowi** Hering. The short dark setae on the mesonotum, the lack of yellow on the scutellum and humeri, and the characters of the wing as indicated in the figure will serve to separate **coloradensis** from **snowi**.

Stenopa affinis, n. sp.
(Fig. 3)

Male: Head whitish pollinose. Frons at vertex half as wide as head, sides nearly parallel. Head mainly white, frontale yellowish medially, on each side with a broad brownish stripe, reaching from side of ocellar triangle to base of antennae. Lower part of frontale with a patch of fine whitish setae. Frontoorbitals except extreme upper pair, ocellars, inner verticals and strong genal bristle black, all others white. Upper medial part of occiput and ocellar triangle black, former with cinereous pollen and white setae. Antennae clay yellow, first and second segments with short black setae, third about one and one-half times as long as wide, upper anterior corner subacute; arista black, short pubescent, and with a narrow light brown ring at apex of basal thickened portion. Face with a brownish central stripe that reaches oral margin. Cheeks with an ochreous spot at lower angle of eye. Proboscis stout, brown. Palpi yellowish brown, with rather strong black and white setae intermixed.



EXPLANATION OF PLATE

Fig. 1 Head of **Chaetostoma elizabethae** (side view)
Fig. 2 Wing of **Chaetostoma elizabethae.**
Fig. 3 Wing of **Stenopa affinis.**
Fig. 4 Wing of **Paroxyna distincta.**
Fig. 5 Wing of **Neaspilota viridescens.**
Fig. 6 Wing of **Paroxyna coloradensis.**

Mesonotum 2.00 mm. long. Thorax dark brown on middle of notum, paler towards its sides, light brown on pleural regions. Whitish pollen lightly distributed over dorsum but not conspicuous except on humeri, notopleura, a spot on posterior part of dorsum and areas forming a lateral stripe on each side and a pair of indistinct median ones. Scattered, rather long, white, stubble-like setae on dorsum and upper pleural regions. All bristles black. Scutellum strongly convex, shining black except for brownish basal corners, that color extending ventrolaterally nearly to apex, with two pairs of strong bristles.

Legs clay yellow except for brownish hind femora. Fore femora with lightly distributed cinereous pollen on outer sides. Bristles and short setae black except for a few short white setae on outer basal portion of front femora.

Wings nearly as in **vulnerata**, but axillary cell wholly white except for dark band running narrowly along anterior margin and crossing apex. Length 5.32 mm., width 2.38 mm. Halteres yellowish, knobs pink.

Abdomen brown, thinly grayish pollinose. Setae on extreme lateral margins black, otherwise white and stubble-like as on thorax. Tergites two to four each with a narrow white-pollinose band posteriorly. Last segment with long black bristles on posterior margin. Venter heavily cinereous pollinose. Genitalia brown.

Type Material: Holotype, male, Bennet Creek, Colorado, September 7, 1933, in the Colorado A. and M. College collection.

The only other known species belonging to **Steñopa** is the genotype S. **vulnerata.** The coloration and structure of **affinis** indicate that it is very close to **vulnerata** but can be distinguished from that species by the white outer verticals, whitish pollinose stripes of the mesonotum, light brownish spots at base of the scutellum and the more extensively white axillary cell.

A NEW GENUS AND FIVE NEW SPECIES OF TRICHOPTERA

D. G. Denning

University of Wyoming, Laramie.

Recent examination of collections of caddis flies sent to me for identification have disclosed several very interesting new species and a new genus which are described herein. Unless indicated otherwise types of the new species are deposited in the writer's collection at the University of Wyoming.

Atopsyche sperryi

This new species, the second described from southwestern United States, is the eighth **Atopsyche** to be described from Central America and the United States.

This species bears closest resemblance to **tripunctata** Banks from which it can easily be distinguished on the basis of the short, stout, dorsally irregular paracercal process, the acute angulation on the ventral surface of

the aedeagus, the acute apical segment of the clasper and several other details of the genitalia.

Male. Length 9.5 mm. Head, thorax and abdomen light brown in color. Forewings uniformly grayish except for three quite prominent irregular light marks near the center of the wings, setae on wings relatively abundant, black.

Genitalia as in fig. 1. No distinct division between ninth and tenth tergites; tenth tergite consists of a very large semi-membranous lobe covered with minute spinules, lobes concave laterally. Ninth sternite bearing a rather short dorsad curved cerus, a small biscuit-shaped process just dorsad to base of cerus, and a very irregularly shaped rather stout caudad directed paracercal process, apex subacute and directed ventro-caudad. Claspers long, slender, basal segment almost twice as long as apical segment, mesal surface bearing a prominent mesad directed projection; distal segment tapering to a sub-acute apex when seen from lateral aspect and acute when seen from ventral aspect. Aedeagus with base wide, tapering gradually to a slender sub-acute apex, ventral surface with an acute triangular projection: internal sclerotized rod curved at base, apex extending slightly beyond dorsal surface.

Holotype. Male, Oak Creek Canyon, Todd's Lodge, Arizona, September 26, 1948, (Grace H. and John L. Sperry).

I take great pleasure in naming this species in honor of Mr. and Mrs. John L. Sperry. This specimen was kindly given to the writer by Dr. Fernand Schmid, Lausanne, Switzerland, to whom I would like to express my sincere appreciation.

Moselyana, new genus

Characters of the genitalia suggest that this genus is near **Allomyia**, but on the basis of the venation of the fore and hind wing, the spur formula and a combination of several other characters it is remarkably distinctive from other described genera.

Characteristics. General structure as for family. Head without warts between lateral ocelli. Antennae as long as wings, basal segment slightly shorter than head. Mesonotum with mesoscutal warts subovate and well delimited. First tarsal segment of forelegs longer than succeeding segment, tibia and tarsus with relatively few spines, no spines present on last tarsal segment of hind leg; spurs as follows: 1-2-2. Forewings, fig. 2, broad, anterior margin rounded: stigma not well marked; Sc does not end in oblique crossvein; distal part of R_1 and R_2 not parallel; discal cell about same length as its pedicel. Hind wing not excised; costal margin with hairs, no hooks; cell R_2 pedicellate; discal cell closed and about same length as its pedicel; M_1 and M_2 divided, cell M_2 reaching as far toward base of wing as discal cell.

This genus is named in memory of Mr. Martin E. Mosely, well known British Trichopterist whose untimely death occurred last August 30, 1948.

Genotype: Moselyana comosa, new species.

Moselyana comosa, n. sp.

Male. Length 7 mm. General color dark brown. Head, thorax, antennae and legs dark brown. Wings brownish throughout with a faint irroration of irregularly scattered small dots.

Ninth segment large, curved dorso-caudad; distal margin heavily clothed with long brown setae especially abundant toward sternum; dorso-caudal corner heavily sclerotized, acute and projected considerably caudad, slightly upturned, fig. 2A. Cerci sub-triangular from lateral aspect, widely separated and quadrate when viewed from dorsal aspect. Tenth tergite relatively short, viewed dorsally, fig. 2B, semi-membranous, mesal lobe bilobed for a short distance, lateral portion projected caudad to nearly same level as mesal portion; on each side of mesal lobe there is a heavily sclerotized, long, slender apically obtuse projection which arises from ventral surface and extends caudad beyond remainder, margin slightly serrate. Claspers long, slender, apex sub-acute from lateral aspect; when seen from ventral aspect, fig. 2A, a heavily sclerotized ridge present along ventral surface extending nearly entire length, curved mesad, setae sparse. Aedeagus, fig. 2C, with main body very slender at base, gradually expanded distad; dorsal branch arcuate; bifid throughout, projected caudad slightly beyond apex of main body.

Holotype. Male, 22 miles north of Prospect, Jackson County, Oregon, June 8, 1941, (Gray and Schuh), (Oregon State College collection).

I would like to express my appreciation to Dr. H. H. Ross of the Illinois Natural History Survey who also examined this species and who also expressed the opinion that it represented a hitherto undescribed genus.

Limnephilus batchawana, n. sp.

This species is related to **nigriculus** (Banks) from which it can be easily differentiated on the basis of the cerci with its large prominent marginal angulation, the short and blunt tenth tergite when seen from the lateral aspect, the longer and narrower clasper, and the shorter stouter lateral arm of the aedeagus.

Male. Length 13 mm. General color light brown. Forewings brownish in color, quite uniformly irrorate with small pale dots which have a tendency to become larger near margins. Head, thorax fuscous, legs flavo-testaceous, antennae and palpi a trifle darker in color than legs. Fore basitarsus one and one-half times length of second. Eighth segment with no modifications, setation sparse.

Genitalia as in fig. 3. Ninth segment with dorsum reduced to a narrow bridge, lateral portion quite wide. Lobes of tenth tergite short and stocky, from lateral aspect distal margin bluntly rounded; seen from dorsal view, fig. 3A, apices gradually divergent and sub-acute. Cerci triangular, caudal margin bearing a large black, prominent, heavily sclerotized projection bearing a scattering of pale brown setae; when seen from caudal aspect heavy ridge occupies central portion of surface; from meso-caudal view, fig. 3B, somewhat hammer-shaped. Clasper fairly well differentiated from

remainder of segment, extending caudad slightly beyond cerci; dorsal margin with a large acute triangular projection. Aedeagus, fig. 3C, with central portion cylindrical, apex constricted at base and directed dorso-caudad; lateral arms rather short and stout, apically divided into a dorsal acuminate branch curved cephalad and ornamented with a scattering of short acute spines and a short ventral branch bearing a series of closely contiguous flat setae, from dorsal view somewhat spoon-shaped; distal margin bearing a number of fine pale colored setae.

Holotype. Male. Batchawana Bay, Lake Superior, Ontario, July 30, 1948, (W. J. Gertsch).

Type deposited in the American Museum of Natural History, New York, N.Y.

Limnephilus sylviae, n. sp.

This species bears little resemblance to other described species. On the basis of the peculiar cerci, tenth tergite and lateral arms of the aedeagus this species may readily be identified.

Male. Length 11 mm. General color dark brown; forewings irrorate, fleckings irregular and scattered. Head, thorax and appendages various shades of fuscous, except tibia and tarsus of third pair of legs which are light brown. Front basitarsus slightly less than twice the length of the following segment, front femora with a linear patch of black spinules. Eight tergite with no modifications, possessing only a few light brown setae.

Genitalia as in fig. 4. Ninth segment reduced dorsally to a narrow bridge, central portion very wide, dorso-caudal corner acutely angulate. Cerci prominent, long, narrowed distally; dorsal margin arcuate, ventral margin irregular; apico-mesal surface bearing a dark heavily sclerotized ridge a small corner of which is discernible from lateral aspect, fig. 4. Lobes of tenth tergite massive, obliquely directed dorsad, projected caudad beyond cerci, apex from lateral view, fig. 4, bluntly rounded; from dorsal aspect, fig. 4A, divided nearly to base, lateral margin very irregular and darkly sclerotized, apices acute. Claspers indistinctly separated from ninth, extending dorsad to tenth tergite, dorsal margin widely emarginate. Aedeagus, fig. 4B, long, cylindrical and robust, lateral plates notched at base, lateral arms shorter than central portion, sharply acuminate apically; when seen from dorsal aspect, fig. 4C, convergent but not quite touching; apex bearing a long slender acute branch, the right arm bearing a small basal branch which is absent from the left arm, fig. 4C.

Holotype. Male, Little Philips Creek, about ten miles northwest of Elgin, Oregon, July 3, 1948. Elevation 4000', (C. P. Alexander).

I take pleasure in naming this species in honor of Mrs. Sylvia Myers who has been of great assistance to the writer in the preparation of this and other manuscripts.

Limnephilus saltus, n. sp.

This species belongs to the **despectus** Walker and **fagus** Ross group. It can readily be distinguished from **fagus**, its closest relative, by the acute

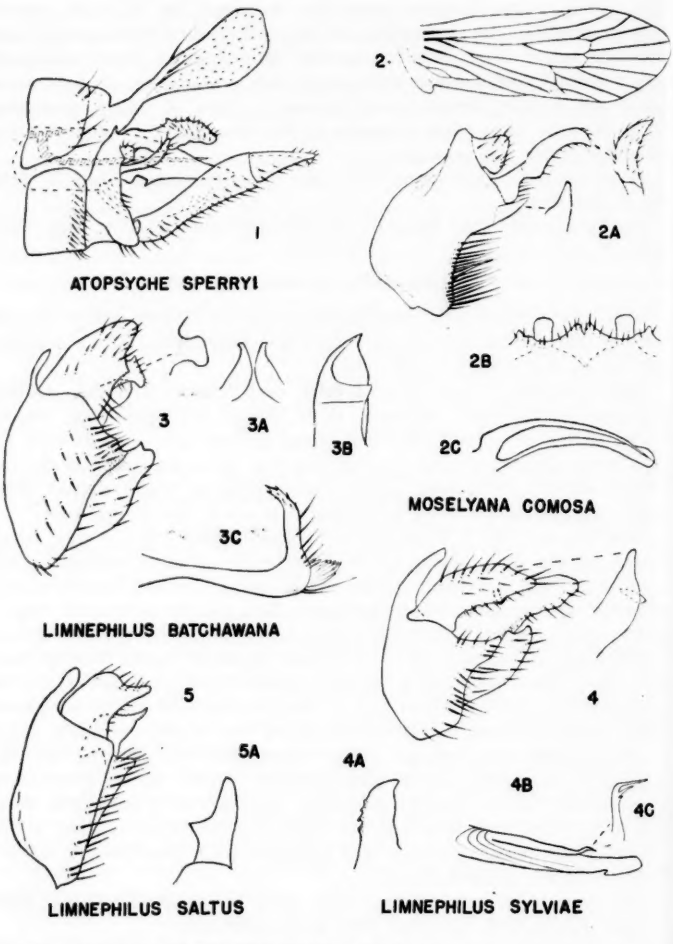


Fig. 1. *Atopsyche sperryi*, male genitalia, lateral aspect.

Fig. 2. *Moselyana comosa*, male forewings; 2A, male genitalia, lateral aspect; 2B, tenth tergite, dorsal aspect; 2C, aedeagus, lateral aspect.

Fig. 3 *Limnephilus batchawana*, male genitalia, lateral aspect; 3A, tenth tergite, dorsal aspect; 3B, cercus, mesocaudal aspect; 3C, aedeagus, lateral aspect.

Fig. 4. *Limnephilus sylviae*, male genitalia, lateral aspect; 4A, tenth tergite, dorsal aspect; 4B, aedeagus, lateral aspect; 4C, lateral arm of aedeagus, dorsal aspect.

Fig. 5. *Limnephilus saltus*, male genitalia, lateral aspect; 5A, cercus, ventral aspect.

triangular projection on the ventral aspect of the cercus. Dr. H. H. Ross kindly compared this species to the type of **fagus.**

Length 12.5 mm. General color dark brown. Head and thorax dark brown, forewings brownish, variegated with dark brown and pale colored fleckings. Fore basitarsus slightly less than one and one-half times length of succeeding segment. Eighth tergite produced into a knob-like mesal lobe which is covered with short black spinules.

Genitalia as in fig. 5. Lobes of tenth tergite wide and bulbous at base, apex narrowed and slightly upturned, dorsal margin minutely serrate, does not extend caudad beyond cercus; seen from dorsal aspect lobes gradually divergent. Cerci subquadrate, apico- dorsal corner produced into a long narrow, apically blunt finger-like projection; seen from ventral aspect, fig. 5A, ventro-mesal surface gives rise to an acute triangular projection. Claspers small, triangular, directed caudad and bearing several long setae. Aedeagus and lateral arms very similar to others of the **despectus** group, the semi-membranous lateral arms bearing a pair of large spines along the ventro-mesal surface of the second fold.

Holotype. Male. Yellowstone Park, Wyoming, near Fishing Bridge, August 22, 1948, (D. G. Denning).

BITING MIDGE IN UTAH

GEORGE F. KNOWLTON
Utah State Agricultural College, Logan

The extremely annoying tiny biting midge, **Leptoconops kerteszi** var. **americana** Carter, again appeared in countless millions around the margins of the Great Salt Lake, the Utah Lake and in several other localities of Utah during 1948.

As usual, farmers, sheep herders, and cattle men in infested areas suffered severely from the tiny blood sucking "demons" during May and June. Again the personnel employed at the Tooele Ordnance Depot, near Tooele, Utah, suffered great discomfort. Management of the $5,000,000 Standard Oil Company refinery project, which is being built just north of Salt Lake City, contacted commercial airplane pest control services, in an effort to secure control of this pest and make working conditions "livable" on the project. Guards, assigned to a nearby truck crossing on the main north-south U. S. Highway 91 out of Salt Lake City, wore, or kept ready for wear, fine mesh "bee veil"-like face and neck protectors. These "veils" were provided to make existence possible while aiding with the refinery construction undertaking.

Nearly every year during the spring, a great deal of annoyance from this tiny pest occurs to many people living or working in infested areas of Utah. Persons exposed to such attack for any length of time, commonly wear a large handkerchief partially inside the hat, the remaining part hanging down over the neck and ears to help protect the wearer from the vicious little "no-see-ums".

NEW BIBIONIDAE FROM MADAGASCAR

D. ELMO HARDY
University of Hawaii, Honolulu.

This report deals with a small collection of **Bibionidae** from Madagascar, received from Dr. Max Beier, Naturhistorisches Museum, Wien. To my knowledge these are the first **Bibionidae** to be reported from Madagascar. The specimens belong to two new species which exhibit relationships with some African species but are very distinctively different.

I am grateful to Dr. Beier for having had the opportunity to study this interesting material.

Plecia gilvipennis n. sp.

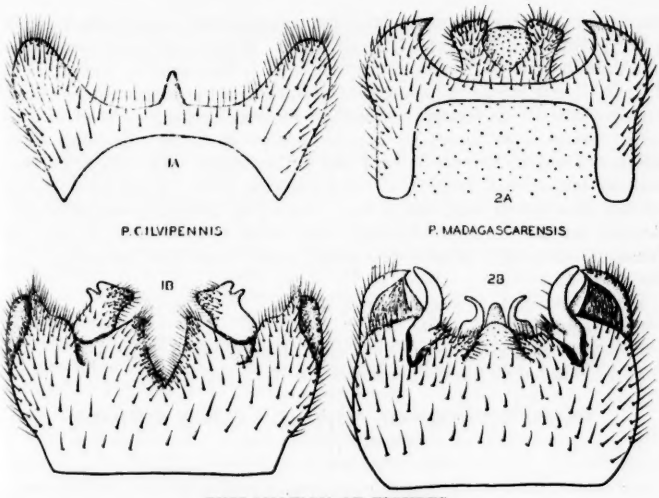
(Figs. 1A-B)

This species is distinct from all others known from the Ethiopian region because of its conspicuously yellow fumose wings and peculiar genitalia. It fits in the group of species which have the body all black but does not show particular affinity to any of them.

Male: Entirely opaque black, densely black pilose. **Head:** Antennae all black, nine-segmented, counting the very small inconspicuous apical segment. Ocellar tubercle large and conspicuous. Mouthparts, excluding the long palpi, very short, rostrum scarcely developed. Palpi about one and one-half times longer than antennae. **Thorax:** Mesonotal furrows rather deep and very conspicuous. Dorsum has no trace of gray pollen and is bare except for some black hairs just in front of the humeral ridges and for some short recumbent pile down the mesonotal furrows. Bases of halteres yellowish, stems and knobs dark brown. **Legs:** Very densely pilose, all segments slender, sides of tibiae and tarsi parallel. **Wings:** Veins and crossveins bright yellow, apical half of costa and radial sector brownish yellow. Stigma concolorous with yellow wing membrace and scarcely discernible. Costa extends about half way between the tips of veins R_5 and M_1. Vein R_{3+4} straight except for sharp bend at its base, forming about a 45° angle with vein R_5. Petiole of cell M_1 two or more times longer than the r-m crossvein. Cubital cell open wide in the wing margin, not at all narrowed. **Abdomen:** Densely black pilose. **Hypopygium:** Very large and well developed, much broader than the remainder of the abdomen giving it a clavate appearance. Ninth tergum very broad, twice wider than long. Posterior lateral margins well developed and broadly rounding at their apices. Posterior median margin has a strong, acutely pointed process which extends half the length of the lateral lobes, the edges of this lobe are serrate (fig. 1A). Ninth sternum developed into a slender lobe at each posterior lateral margin. Posterior median margins of the sternum have a pair of rather acutely pointed lobes separated by a deep 'V' shaped concavity. Claspers very irregular, broadly rounded, densely haired on the inner apices and developed into two lobes on outer apices (fig. 1B).

Length: Body, 7.0 mm.; wings, 9.0 mm.

Female: Antennae eleven-segmented and all black. Ocelli not on a well developed tubercle, scarcely raised above level of front. Front opaque brown with a rather well developed tubercle just above antennae and



EXPLANATION OF FIGURES

1. **Plecia gilvipennis** n. sp.
   A. ninth tergum of male
   B. ninth sternum of male
2. **Plecia madagascarensis** n. sp.
   A. ninth tergum of male
   B. ninth sternum of male

without a prominent ridge extending to ocellar triangle. Wing veins and membrane more intense yellow, none of the veins tinged with brown. Otherwise like male except for genital characters.

Length: Body, 7.5-8.0 mm.; wings, 11.0 mm.

Holotype male, allotype female and five paratypes, three males, two females: Sikora, Madagascar.

Type, allotype and three paratypes returned to the Naturhist. Museum, Wien. One paratype in the U.S. Nat. Museum, Washington, D.C. One in Bishop Museum, Honolulu, Hawaii.

Plecia madagascarensis n. sp.

(Figs. 2A-B)

This species somewhat resembles **P. erubescens** Speiser but the male genitalia are very different. It is best distinguished by having the ninth tergum developed into a pair of strong lateral lobes and the sclerite nearly divided by the deep concavities on the posterior and anterior margins. The development of the ninth sternum and the clasping structures are also very different.

Male: Entirely opaque black, pile of legs and abdomen dense and black. Head: Rostrum short, not over three-fourths as long as the antennae. Antennae black and only eight-segmented. **Thorax:** With no evidence of gray pollen on the dorsum and bare except for a clump of black hairs in front of each humerus. Mesonotal furrows deep and conspicuous. **Legs:** All black,

with no rufous tinge. Segments long and slender, femora moderately swollen at their apices, tibiae not at all enlarged. **Wings:** Light brown fumose, stigma faint. Vein R_{3+4} curved, forming a 65° angle with R_5. Petiole of cell M_1 twice longer than r-m crossvein. Cubital cell not at all narrowed at apex. **Hypopygium:** Ninth tergum wider than long and nearly divided into two plates; lateral lobes joined by narrow sclerotized bridge. Posterior lateral margins of tergum curved inward and rather clasper-like (fig. 2A). Ninth sternum wider than long, with two pairs of lobes on its hind margin. Lateral lobes rather long and pointed, extending beneath bases of claspers. Claspers slender, curved outward, each with a small lobe at its base. Aedeagus has a pair of well developed, rather hook-like, accessory structures (fig. 2B).

Length: Body, 4.3-4.5 mm.; wings, 6.0 mm.

Female unknown.

Holotype male and one paratype male: Sikora, Madagascar.

Both returned to the Naturhistorisches Museum, Wien.

INSECT FOOD OF THE BULLOCK ORIOLE

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Utah Agricultural Experiment Station, Logan

An examination of the stomach contents of twelve Bullock orioles, **Icterus bullocki bullocki,** collected in various parts of Utah during 1940 to 1942, inclusive, showed the following insects to be present in recognizable condition: 5 Collembola; Orthoptera, Locustidae 12 (7 nymphs)—including 1 **Melanoplus packardi** Scudder, 1 **M. mexicanus** Riley; 7 miscellaneous Hemiptera, 2 Miridae—**Lygus elisus** Van D., 14 Lygaeidae—**Nysius ericae** (Schil.), 1 Corizidae—**Corizus punctiventris** (Dall.), 1 Coreidae—**Leptoglossus occidentalis** Heid., 4 Pentatomidae—including 2 **Euschistus variolarius** (P.-B.), and 2 Nabidae. 3424 Homoptera, including 1 Membracidae—**Campylenchia latipes** (Say), 1 Cicadellidae, 3 Chermidae—including 2 **Trioza maura** Foerst, 2724 Aphididae including 9 **Cinara** sp., 1 **Clavigerus smithiae** (Monnel), 5 **Periphyllus negundinis** (Thomas), 7 **Aphis chrysothamni** Wilson, 3 **A. maidis** (Fitch), 5 **Toxoptera graminum** (Rand.), 135 **Rhopalosiphum prunifoliae** (Fitch), 8 **Brevicoryne brassicae** (L.), 257+ **Macrosiphum pisi** (Kalt.), 6 **M. coweni** (Hunter), 1 **M. ludovicianae** (Oest.), and 351 **M. granarium** (Kirby); 1 Coccidae.

40 Coleoptera, including 1 Carabidae, 1 Buprestidae, 2 Scarabaeidae, **Aphodius** sp., 19 Curculionidae, including 3 adult and 12 larval alfalfa weevils, **Phytonomus posticus** (Gyll.). 16 Lepidoptera, all larvae, including cutworms, 2 corn earworms in a stomach collected at Randlett, Utah, June 6, 1940, and 2 sugar beet webworms. 3 Diptera; 23 Hymenoptera, including 17 Formicidae, 1 Andrenidae and 1 Megachilidae.

In addition, 1 Solpugidae, 3 Arachnida, spiders and some plant fragments also were recognized.

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Insect Food of the Bullock Oriole
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[1] Research professor of Zoology and Entomology

A REVISION OF THREE GENERA OF DELPHACINE FULGORIDS FROM AMERICA NORTH OF MEXICO

(Homoptera-Fulgoridae-Delphacinae)

L. W. MORGAN and R. H. BEAMER*

The genera **Pissonotus** Van Duzee (1897), **Phyllodinus** Van Duzee (1897), and **Phyllodictus** Ball (1926), resemble each other externally quite closely. **Pissonotus** and **Phyllodictus** have internal male genitalia of the same general character; that is, the aedeagus is long and slender, often with slender, retrorse processes on the dorsal margin of the outer third; the styles are sinuately curved with overhanging apices and there is at least one pair and sometimes two pairs of processes ventrad to the styles. **Phyllodinus**, however, has an entirely different type of internal male structure, lacking the above characters. **Pissonotus** and **Phyllodinus** are, therefore, considered good genera and **Phyllodictus** a subgenus of **Pissonotus.** They may be separated by the following key:

Crown broader than long; head wider than pronotum and pronotal carinae following curve of eye, not nearly reaching hind margin of pronotum ..... **Phyllodinus**

Crown usually considerably longer than broad, head usually narrower than pronotum and pronotal carinae almost straight and reaching or almost reaching the hind margin of pronotum..... **Pissonotus**

KEY TO SUBGENERA OF PISSONOTUS

Front tibiae distinctly flattened laterally ..... **Phyllodictus**

Front tibiae not distinctly flattened laterally ..... **Pissonotus**

Genus Phyllodinus Van Duzee

Phyllodinus Van Duzee, E. P., Bull. Buff. Soc. Nat. Sci., p. 240, 1897.

"Form short and stout, square before. Head wider than the pronotum. Vertex quadrangular, a little wider than long, passage to the front strongly rounded. Front broad, base and apex nearly equal, the sides feebly convex; median carina forked opposite the middle of the eyes. Clypeus tricarinate. Cheeks narrow, broad at apex, the edges almost parallel below the inner angle of the eyes. Eyes large, transverse, deeply excavated below. Antennae stout, the two basal joints about equal in length. Pronotum short, anterior edge straight between the eyes, posterior very feebly excavated, lateral carinae following the contour of the eyes. Scutellum short. Elytra in brachypterous form with strong reticulated nervures. Anterior and intermediate feet with the posterior coxae strongly flattened, the femora deeply sulcate within. Posterior tibiae bispinose."

Genotype Phyllodinus nervatus Van Duzee.

1. Phyllodinus nervatus Van Duzee

Phyllodinus nervatus Van Duzee, E. P. Bull. Buff. Soc. Nat. Sci., p. 241, 1897.

"Form oblong, broad and short. Head wider than pronotum, vertex nearly square, a little transverse, the edges nearly rectilinear, the anterior

* Contribution from the Department of Entomology, University of Kansas.

fova long-triangular, reaching over the rounded anterior edge of the head. Front oblong, a little expanded opposite the lower angle of the eyes; middle keel distinct for its whole length on the front but obsolete on the base of the clypeus. Pronotum shorter than the vertex, the fore and hind margins nearly straight and parallel, lateral carinae much curved. Sides of the large scutellum concave, the lateral carinae straight and oblique; near the basal angles. Elytra short and broad, covering the fifth abdominal segment, rounded behind. Pygofers of the male compressed laterally, the aperture narrow, forming a rounded pocket below to enclose the short slender curved styles, which are approximated but do not quite touch at their tips. Wall of the anal aperture square and produced on the ventral aspect, the lower angles acute and nearly touching one another. Femora and tibiae of the anterior and intermediate feet thin and broadly expanded. Length 2½ to 3 mm.

"Color piceous brown. Vertex pale, a short anterior median line and a row of dots on either side brown; disc of the pronotum and its carinae pale; scutellum pale with the basal angles and double median line brown. Elytra subhyaline, smoky, with numerous heavy ramous white nervures. Front blackish with the carinae and a double row of dots on either side pale. Carinae of the clypeus in part, rostrum, excepting its tip, edges of the femora, and tips of the tibiae, some marks on the pleural pieces, sternum and coxae below, and the apical joint of the antennae, pale. Disc of the tergum in the female tinged with reddish with a more or less complete double row of pale spots on either side. Tip of the genital pieces and the oblong plates at the base of the oviduct in the females whitish. Deflexed sides of the pronotum expanded into a large white plate at the base of the elytra.

"New York and Canada. Not uncommon near Buffalo on damp seepy meadows in June. Also taken in Welland Co., Ont., and at Muskoka Lake in July. This is our largest northern Delphacid. Its square form and brown color with the strongly ramously veined elytra will distinguish it."

Genitalia: In lateral view pygofer more or less triangular, dorsal margin almost pointed; styles protruding from caudal margin with sides almost parallel to knobbed apices; aedagus long and slender, sides almost parallel to slight enlargement near outer third, with about four sharp teeth on each margin at this point; anal segment with a pair of sharp processes directed ventrally. In ventral view styles widest at base, shaft strongly narrowed on inner margin before middle, slightly curved into knobbed apices; aedeagal brace not extended dorsally.

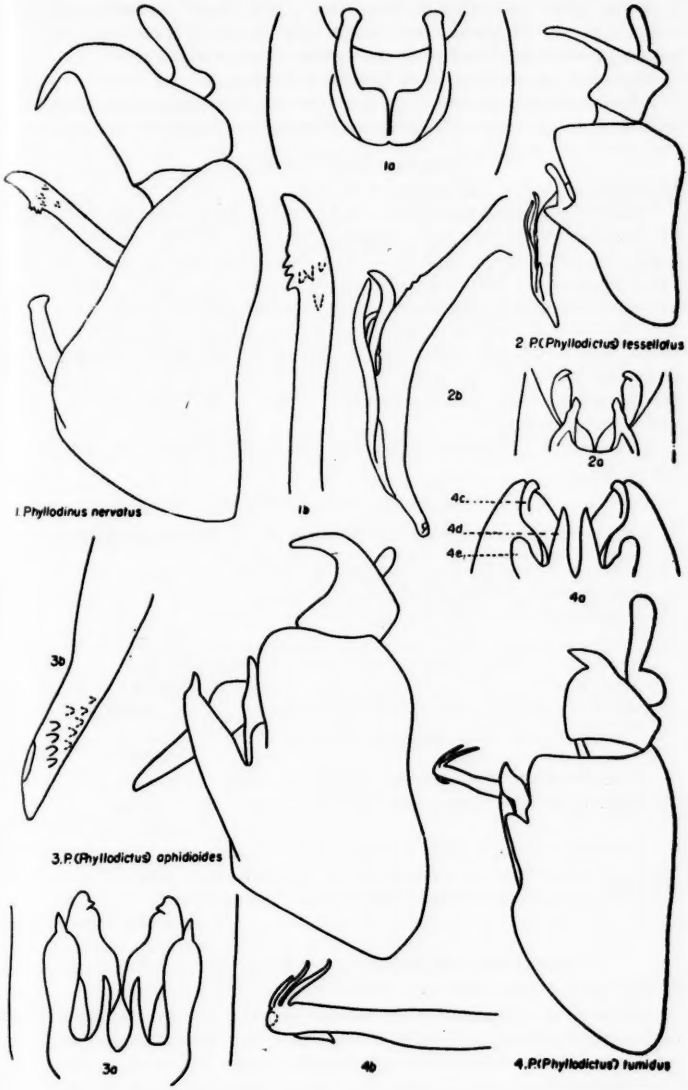
PLATE I

1 **Phyllodinus nervatus** Van Duzee, lateral view of ♂ genital capsule; 1a, ventral view of styles in position; 1b, lateral view of aedeagus.

2 P. **(Phyllodictus) testellatus** (Ball), lateral view of ♂ genital capsule; 2a, ventral view of styles and processes in position; 2b, lateral view of aedeagus.

3 P. **(Phyllodictus) aphidioides** (Van Duzee), lateral view of ♂ genital capsule; 3a, ventral view of styles and processes in position; 3b, lateral view of aedeagus.

4 P. **(Phyllodictus) tumidus** n. sp., lateral view of ♂ genital capsule; 4a, ventral view of styles and processes in position; 4b, lateral view of aedeagus; 4c, ventral view of styles; 4d, median processes; 4e, lateral processes.


1a
1 Phyllodinus nervatus
1b
2 P.(Phyllodictus) tessellatus
2b
2a
4c.
4d.
4e.
4a
3b
3.P.(Phyllodictus) aphidioides
3a
4b
4.P.(Phyllodictus) tumidus

Oman (Iowa State College Jour. Sci., p. 216, Sept. 30, 1946) designated a lectotype ♂, Muskoka, Ont., July, 1888, E. P. V. Coll., and lists six females, Iowa, which belong to the original Van Duzee series.

Types are in the Iowa State College Collection.

Additional specimens were studied from the following states: New York, Michigan, South Dakota, Wyoming, Colorado and Manitoba, Canada.

Subgenus **Phyllodictus** Ball

Phyllodictus Ball, E. D. Florida Ent., p. 18, 1926.

"Resembling **Pissonotus** in size and form but with expanded tibiae as in Phyllodinus. Head definitely narrower than the thorax, the vertex narrower than the long diameter of the eye. Front somewhat broader than long. The carinae of the vertex and front as in Pissonotus. Lateral carinae of the pronotum straight divergent, becoming obsolete before the posterior margin. Middle and anterior femora and tibiae expended, the anterior tibiae broad and foliaceous, sometimes as broad as the front. Brachypterous elytra short, as wide or wider than long. Venation reticulate or obscure. Macropterous elytra hyaline, venation simple as in Pissonotus, not more than 5 apical veinlets."

The statement "venation reticulate" should be deleted from the generic description.

"Type of the genus **P. tessellatus** n. sp."

KEY TO THE SPECIES OF PISSONOTUS (PHYLLODICTUS)

1. Dorsum without white crossband on elytra 2
   Dorsum with white cross-band on elytra 4
2. Venation of elytra of brachypterous form densely reticulate..... **tessellatus** (Ball) (2)
   Venation of elytra of brachypterous form not reticulate..... 3
3. Veins of elytra of brachypterous form light..... **aphidioides** (Van. D.) (3)
   Veins of elytra of brachypterous form dark ..... **tumidus,** n. sp. (4)
4. Dorsum of abdomen with rows of pustules on each side..... **flabellatus** (Ball) (5)
   Dorsum of abdomen without pustules on sides 5
5. With a distinct white band between clypeus and clypellus..... **spooneri** new name (6)
   Without a distinct white band between clypeus and clypellus..... 6
6. First segment of antennae twice as long as wide..... **nitens** (Van. D.) (7)
   First segment of antennae not twice as long as wide..... **basalis** (Van. D.) (8)

2. **Pissonotus (Phyllodictus) tessellatus** (Ball) new comb.

Phyllodictus tessellatus Ball, E. D., Florida Ent., p. 19, 1926.

"Superficially resembling **Phyllodinus nervatus** but smaller with shorter elytra and strikingly different venation. Brownish heavily tessellated above with pale, except for the abdomen. Length 2 mm.

"Head narrow, vertex longer than wide, about equalling the pronotum, rounding over to the broad retreating front; carinae obscure, the fork

long and narrow. Front very broad, almost square, weakly tricarinate. Clypeus tumid. Pronotum broad, parallel-margined, the lateral carinae with one or two short spurs on the inner margins. First joint of antennae short, as broad as long, second joint three or more times the first in length. Brachypterous elytra narrow, covering the second segment, closely and evenly reticulate. Macropterous elytra with simple venation as in **flabellatus** except that all the main veins are forked and there may be a few faint reticulations in this region.

"Color: Vertex, pronotum, scutellum and elytra white, irrorate and tessellate with brown. Abdomen brown with a few pale lines. Vertex with a brown band on the anterior margin and a pair of black spots at base, a larger pair on pronotum. Front shining brown, clypeus pitchy, a broad white band on suture. Antennae and anterior legs brown. Macropterous elytra transparent the nervures covered with setigerous black dots and there is a black spot before the apex of clavus.

"Type female, allotype male and 9 paratypes collected in low wet 'flat woods' at Sanford, Fla., by the writer and one paratype female taken at Meridian, Miss. (Drake)."

Genitalia: In lateral view pygofer of male rather triangular with ventral margin shortest, caudal margin with a large V-shaped projection, extended on its dorsal side into a long, round-tipped, median process; aedeagus long and slender, gently curving ventrally, widest near middle with 3-4 retrorse, long slender processes on dorsal margin of outer half, some of processes half as long as shaft; anal segment with a pair of long, almost straight processes with slightly enlarged, rounded apices. In ventral view, styles sinuate, widest on outer third, narrowed to inwardly overhanging apices; median processes widest at base, narrowed on outer margin to rather sharp apices about two-thirds as long as styles; lateral processes almost triangular, less than half as long as median.

Types in the Ball Collection located in the U.S. National Museum.

Numerous specimens are at hand from many localities in Florida, Ocean Springs, Miss., and one female from Barberton, Ohio.

3. **Pissonotus (Phyllodictus) aphidioides** (Van Duzee) new comb.

Pissonotus aphidioides Van Duzee, E. P., Bull. Buffalo Soc. Nat. Sci., V, p. 190, 1894
Pissonotus aphidioides Van Duzee, E. P., Bull. Buffalo Soc. Nat. Sci., V, p. 239, 1897.

Brachypterous form:

"Broad oval, widest across the abdomen. Elytra reaching on to second abdominal segment, the nervures prominent. Color wood-brown inclined to yellowish on the legs and discs of tergum; pleural pieces and sides of the abdomen obscurely marked with piceous; pronotum and usual transverse band on face, whitish; the latter followed by a broad piceous band across the base of the clypeus and anterior coxae. Cheeks marked with an oval black spot below the antennae. Front with about three transverse pale lines two of which are nearer the base, the other may be reduced to two points adjoining the whitish apical band. Base of the scutellum irrorated more or less with whitish, tibiae and tips of the tarsi brown. Elytra brown, sub-opake, with paler nervures. In one example the vertex

is white with the fovae and a dot on either side at apex black, and the base of the tergal segments are brownish yellow. Length 3 to 3½ mm."

"New York. Described from two female examples, one taken at Salamanca, August 2, 1889, the other at Colden a few days earlier. The latter is a larger and darker specimen bearing a striking resemblance to some of our brown plant lice."

Structure: Basal segment of antennae slightly more than one half as long as second segment; dorsum of abdomen covered with numerous fine, white hairs.

Color: General body color varies from light to dark brown, spots on cheeks irregular in shape, darker brown than surrounding areas; pronotum varies from white to deep brown in color.

Genitalia: In lateral view pygofer of ♂ more or less rectangular, widest near venter with a lateral process about as large as a style, projecting dorsally; aedeagus widest at base, sides almost parallel, dorsal margin rapidly narrowing near middle to fairly sharp apex, shaft with a diagonal row of short teeth on each side just before tip; styles widest at base, almost as long as aedeagus, suddenly narrowing on outer half to sharp apices; anal segment with a pair of short, blunt processes. In ventral view styles widest near middle, strongly narrowed on inner margin to more or less avicephaliform apices; lateral processes of pygofer almost as long as styles; greatly enlarged on outer third but extreme apices very slender and sharp; median pair of processes widest at base, curved in on outer third, about half as long as styles.

Lectotype ♀, Salamanca, N.Y., August 2, 1889, E. P. Van Duzee, designated by Oman, P. W. (Iowa State College Journal of Science, Vol. 21, No. 2, January, 1947, p. 216). Allotype ♂ and 10 parallotypes, Otter Lake, N.Y. July 25, 1946, R. H. Beamer; other parallotypes: 3 ♂♂, Blue Mt. Lake, N.Y. July 27, 1946, R. H. Beamer; 1 ♂, Storrs, Conn., August 10, 1946, R. H. Beamer; 1 ♂, Swan River, Manitoba, Canada, August 2, 1937, R. H. Beamer.

Allotype and parallotypes in Snow Entomological Collections.

Lectotype ♀ in the Iowa State College Collection, Ames, Iowa.

4. **Pissonotus (Phyllodictus) tumidus** n. sp.

Brachypterous form:

Resembles **Pissonotus aphidioides** except veins of elytra marked with brown, dorsum of first antennal segment with dark line and aedeagus of male with several long slender processes at apex. Length ♂ 2.6 mm.; ♀ 3.3 mm.

Structure: Basal segment of antennae one-half as long as second segment; front about twice as long as wide at widest portion, middle portion with sides subparallel, slightly narrowed in middle, carinae present but indistinct; elytra almost rectangular, membraneous, veins raised, prominent, elytra hardly covering first visible abdominal segment; dorsum of abdomen set with short white hairs closer together than their length; fore and intermediate femora and tibiae compressed laterally.

Color: General color fuscous; antennae varying from light to dark brown, darker line on dorsum of basal segment; vertex dirty white, with

dark rounded spot in each fovae; front brown, marked with white bars and spots; pronotum dirty white with brown spot on each side of median carina and back of each eye; masonotum usually dirty white, marked with irregular brown spots lateral of median carina; elytra hyaline, veins marked with brown, at least on basal half, otherwise whitish; legs more or less dark; clypellus dark brown, almost black.

Genitalia: In lateral view pygofer of ♂ more or less rectangular with caudal margin broken by large blunt tooth located slightly above middle line; aedeagus widest at base, slightly constricted near apical third, apex rounded, slightly enlarged with four recurved slender processes, three on dorsal margin and one on left ventral side; anal segment with a pair of short heavy processes. In ventral view styles widest near outer third, apices roundingly narrowed to overhung tips; median processes widest at base, narrowing to sharp apices, more than half as long as styles; lateral processes broad, bluntly rounded, about one-half as long as median.

Holotype ♂, Keld, Manitoba, Canada, August 8, 1937, R. H. Beamer; allotype ♀, Red Deer River, Manitoba, August 3, 1937, R. H. Beamer; Paratypes: 1 ♀, Mafeking, Manitoba, August 3, 1937, R. H. Beamer; 1 ♀, Cedar River, Michigan, August 28, 1937, R. H. Beamer; 1 ♂, Storrs, Conn., August 10, 1946, R. H. Beamer; 1 ♂, Boscawen, New Hampshire, August 12, 1946, R. H. Beamer; 1 ♀, Dingman's Ferry, Pa., August 20, 1946, R. H. Beamer; 1 ♂, Allegheny State Park, New York, July 22, 1946, R. H. Beamer; 1 ♀, Boston, New York, July 28, 1907, E. P. Van Duzee; 1 ♀, Niagara Falls, New York, August 17, 1907, E. P. Van Duzee.

Types and paratypes in Snow Entomological Collections; paratypes in Calif. Acad. Sci. Collections.

5. **Pissonotus (Phyllodictus) flabellatus** (Ball) new comb.

Phyllodinus flabellatus Ball, E. D., Can. Ent., 34, p. 232, 1902.
Phyllodinus koebelei Osborn, Herbert, Ohio Nat., 4, p. 46, 1903.
Phyllodinus fuscous Osborn, Herbert, Ohio Nat., 4, p. 46, 1903.

"Larger and lighter colored than **nervatus**, and with a longer vertex. Testaceous brown, with the posterior half of the vertex, the scutellum and the tips of the short wing pads milky white. Length, brachypterous ♀, 3 mm., width 2 mm. Head slightly narrower than pronotum, vertex nearly quadrate, rounding in front. Front parallel-margined, much longer than wide. Elytra about as long as head and pronotum, truncate behind, venation simple, indistinct. Colour: vertex and face dark brown, with about seven narrow interrupted transverse white bands. A light stripe across the apex of front, extending on across the genae to join the stripe on the reflexed portion of pronotum. Clypeus piceus, pronotum with the anterior half piceous brown, posterior half and scutellum milky white. Elytra brown, the posterior margin milky white, broadest towards the costal margin. Abdomen above brown, a median and three lateral rows of white dashes, the anterior ones reduced to dots. Below dark brown or pitchy. Two anterior pairs of femora dirty straw, their foliaceous tibiae fuscous, the tarsi white, tipped with black.

"Described from two females, one from Washington, D.C., from the collection of Otto Heidemann, and the other from Riverton, N.J., collected

by C. W. Johnson, and sent by E. P. Van Duzee. Another female from the District of Columbia apparently belongs here, but is immature and not fully coloured. This is a pretty species, and might be mistaken for a **Pissonotus** but for the foliaceous tibiae."

The brachypterous ♀ specimen from Washington, D.C., is here designated lectotype. The types are in the E. D. Ball Collection in the U.S. National Museum.

Genitalia: In lateral view pygofer of ♂ more or less triangular, narrowest on ventral margin; median processes and styles usually not visible; aedeagus long and slender, slightly curved ventrally, sides almost parallel to outer third where it narrows to rounded apex, usually three retrorse, slender processes on dorsal margin of outer third, longest more than half as long as shaft; anal segment with a pair of short, almost triangular, processes. In ventral view styles sinuate, shorter than median processes, widest near outer third, narrowed to rounded overhanging apices; median processes widest at base, narrowed to sharp incurving apices.

Allotype ♂ and 2 ♂ parallotypes Lancaster, N.Y., July 25, 1946, R. H. Beamer; other parallotypes: 3 ♂♂, Woolwine, Va., Sept. 1, 1946, R. H. Beamer; 1 ♂, Barberton, Ohio, July 8, 1936, L. J. Lipovsky; 1 ♂, Fredonia, N.Y., July 21, 1946, R. H. Beamer; 1 ♂, Onarga, Ill., July 13, 1946, R. H. Beamer; 18 ♂♂, Douglas Co., Kans., 1944, R. H. Beamer; 2 ♂♂, Ponce de Leon, Fla., March 7, 1947, R. H. Beamer; 2 ♂♂, Palatka, Fla., March 10, 1947, R. H. Beamer; 1 ♂, Zolfo Springs, Fla., March 12, 1947, R. H. Beamer.

Macropterous form:

Like the brachypterous form except with flight wings about one-third their length longer than abdomen, generally darker in color with tip of scutellum light and with a dark spot on elytra at apex of clavus.

Holomorphotype ♂, Woolwine, Va., Sept. 1, 1946, R. H. Beamer; allomorphotype ♀ and 6 ♀ paramorphotypes, Lawrence, Kansas, Sept., 1944, R. H. Beamer; other paramorphotypes: 3 ♀♀, Douglas Co., Kansas, Nov. 3, 1945, R. H. Beamer; 1 ♀, Medora, Kansas, Aug. 5, 1945, R. H. Beamer.

Types in Snow Entomological Collections.

The types of **Phyllodinus fuscous** Osb. and **Phyllodinus Koebelei** Osb. were checked Jan. 20, 1949, and the above synonymy found to be correct.

6. **Pissonotus (Phyllodictus) spooneri**, new name and comb.

Pissonotus piceus Spooner, Can. Ent., 44, p. 238, 1912.

"Brachypterous ♀. A small species slightly smaller than **P. brunneus** and not so stout. Head short, very slightly curved in front. Eyes slightly indented below to receive the antennae; colour light gray around margins,

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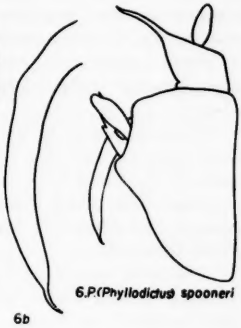
PLATE II

5 P. **(Phyllodictus) flabellatus** (Ball), lateral view of ♂ genital capsule; 5a, ventral view of styles and processes in position; 5b, lateral view of aedeagus.
6 P. **(Phyllodictus) spooneri** n. name, lateral view of ♂ genital capsule; 6a, ventral view of styles and processes in position; 6b, lateral view of aedeagus.
7 P. **(Phyllodictus nitens** (Spooner), lateral view of ♂ genital capsules; 7a, ventral view of styles and processes in position; 7b, lateral view of aedeagus.
8 P. **(Phyllodictus) basalis** (Van Duzee), lateral view of ♂ genital capsule; 8a, ventral view of styles and processes in position; 8b, lateral view of aedeagus.

5. P.(Phyllodictus) flabellatus

5a

5b

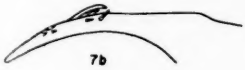


6. P.(Phyllodictus) spooneri

6b

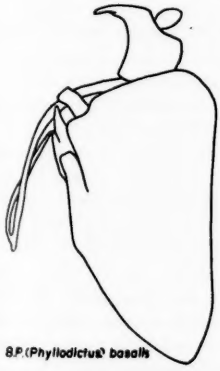
6a

7a



7b

7. P.(Phyllodictus) nitens



8. P.(Phyllodictus) basalis

8a

8b

black in the centre; vertex about as deep as wide in front, sides curving between the eyes, narrower behind the eyes than before; all the carinae present, but all rather weak, foveae not very deep, colour deep shiny black.

"Front rather wide and short, sides nearly straight, median carina very faint; anterior three-fourths deep shiny black, posterior one-fourth pure white.

"Clypeus uniformly black; median carina but a mere suggestion; the black band carried across the anterior coxae as usual; posterior of this a band of white and towards the tip of the abdomen, black.

"Basal segment of the antennae about one-third as long as the second segment; basal segment brown, second segment honey-yellow spotted with white, tuberculate.

"Prothorax about as deep as the head, posterior margin very slightly concave, median carina practically indistinguishable, lateral carinae distinct for about two-thirds of their length and then fading out; colour pure white.

"First and second pairs of legs with the coxae light brown, shading through black on the femora and tibiae to white on the first two tarsal segments, the last tarsal segment black, tibiae of the first and second pairs of legs foliaceous; third pair of legs shading from dark brown at the base of the femora to honey-yellow on the tibiae to white on the tarsi, tips of the tarsi black.

"Scutellum triangular, sides straight, not visible for its entire breadth, covered by the prothorax on its outer edges; median carina indistinct, lateral carinae short, curved outward, poorly defined; colour uniform deep shiny black.

"Elytra short, not quite covering the first abdominal segment, coriaceous, polished, veins indistinct; colour, basal three-fourths deep shiny black, posterior one-fourth pure white.

"Abdomen uniform shiny black; genitalia deep reddish brown, almost black; pygofer tapering to a blunt point, plates very short, extending only one-fourth of the length of the pygofers, only a small edge visible; style white. Length, 2.5 mm.

"A very pretty and delicate insect. The foliaceous tibiae recall **Phyllodinus**, but the carinae of the prothorax are straight and the other characters agree with **Pissonotus**; it may deserve to be placed in a new genus, but for the present I prefer to place it in **Pissonotus**. The species is very easily identified by the white thorax and white margin of the elytra and by the deep shiny black of the rest of the body. Described from a specimen taken by the author at Middletown, N.Y., July 11, 1910. Two other specimens were taken at the same locality July 18 and 21, 1910. Type in the author's collection."

Genitalia: In lateral view male pygofer more or less rectangular, ventral margin narrowest; median process long and sharp with a notch near middle of outer margin; style club-shaped; aedeagus widest near base, gently curved ventrally, gradually narrowed to ungulate tip; anal segment with a pair of very long, slender, scarcely curved, processes. In ventral view styles long,

sinuate, with rounded, slightly overhanging apices; median processes widest at base, almost as long as styles, sharply narrowed just beyond middle to long, slender, finger-like process on inner margin; lateral processes very short, mere angular projections.

The name **Pissonotus piceus** Spooner 1912 is preoccupied by **Pissonotus piceus** (Van. D.) 1893, (Megamelus). The name is therefore changed to **Pissonotus (Phyllodictus) spooneri,** new name and combination.

7. Pissonotus (Phyllodictus) nitens (Van Duzee)

Phyllodinus nitens Van Duzee, E. P., Bull. Buff. Soc. Nat. Sci., 9, p. 198, 1909.
Phyllodictus nitens (Van Duzee) Ball, E. D., Florida Ent., p. 20, July 1926.

"Somewhat allied to **Koebelei** but with much the aspect of **Pissonotus** ater or **delicatus.** Brachypterous female: head distinctly narrower than the pronotum; vertex quadrate; front moderately wide, slightly convex, highly polished and feebly carinate. Pronotum short, scarcely carinate. Elytra reaching onto the second abdominal segment, without visible neuration. Anterior tibiae very broad; foliaceous, about twice the width of the femora. Length 2½ mm.

"Color rufo-piceous, darker on the abdomen and anterior tibiae. Elytra clear rufous with a sharply defined white apex; pronotum, except anteriorly, and the posterior tibiae testaceous white. Front concolorous.

"Macropterous female: Elytra longer than the abdomen, whitish hyaline, narrowly infuscated at base; nervures slender, concolorous, the marginal brown becoming whitish on base of the commissure. Color piceous black, paler beneath; base of the pronotum white; tip of the scutellum fulvous. In both forms the antennae are pale with the basal joint rufous. In this as in the allied species the scutellum is much larger in the macropterous form.

"Described from two female examples: one brachypterous from St. Petersburg and one macropterous from Estero. This species may be distinguished from all its congeners by its uniformly colored front. With **Koebelei** Osb., **fuscous** Osb. and **flabellatus** Ball, it forms a group of species closely resembling Pissonotus and distinguished from the typical species **nervatus** by the much narrower head. The present species is peculiar in being highly polished all over."

Genitalia: In lateral view pygofer of male almost oval, caudoventral corner with slight projection (lateral process); median process extending ventrally in a sharp point and dorsally in two sharp processes; styles almost parallel-sided with blunt apices; aedeagus widest at base, slightly curved ventrally, narrowed to sharp apex with a number of retrorse spines on dorsal margin of outer half, usually not more than one of which is longer than width of shaft at that point; anal segment with a pair of long, almost straight processes whose sides are almost parallel. In ventral view styles widest near middle, narrowed to inward curving apices which are slightly overhanging; median processes long and narrow, sharp pointed at both ends, bifid dorsally; lateral processes very short, more than a right angle.

The brachypterous ♀, St. Petersburg, Fla., April 28, 1908, E. P. Van

Duzee, described above is here designated lectotype. It is type No. 3057 in the Collection of the California Academy of Science.

Allotype ♂ Daytona, Fla., May 22, 1926, E. D. Ball; parallotypes; ♂ Sanford, Fla., June 17, 1926, E. D. Ball; 1 ♂ same place and collector, Sept. 6, 1926; 1 ♂ same place and collector, March 10, 1927; 3 ♂♂, Venice, Fla., April 13, 1928, on Helianthus.

Allotype and parallotypes in E. D. Ball collection in U. S. Nat. Mus.; parallotype in Snow Entomological Collections.

8. Pissonotus (Phyllodictus) basalis (Van Duzee)

Pissonotus basalis Van Duzee, E. P., Bull. Buff. Soc. Nat. Sci., 5, p. 190, 1894. (Listed) (Nom. nud.)
Pissonotus basalis Van Duzee, E. P., Bull. Buff. Soc. Nat. Sci., 5, pp. 227, 238, 239, 1897
Dicranitropis marginatus Crawford (nec. Van Duzee). Mon. Delphacidae, p. 596, pl. 46, figs. P, Q (described, illustrated); 594 (key), 1914.
Pissonotus crawfordi Metcalf, Z. P., Jour. Elisha Mitchell Soc., 38, p. 148, 1923. Nom. nov. for **Dicranitropis marginatus** Crawford (nec. Van Duzee), p. 170; pl. 69, fig. 674.
Pissonotus basalis Oman, P. W., Iowa State Jour. Sci., 21, No. 2, Jan. 1947, pp. 217-221

"Macropterous form. Allied to **marginatus** but differs in having the scutellum much larger, about as in **Liburnia pellucida** which this species much resembles. It is however a much stouter insect than the latter and the hind edge of the pronotum is straight. Front narrower than in **P. marginatus,** the median carina distinct. Color piceous black, hind edge of the pronotum broadly white, extreme tip of the scutellum and narrow apex of the front yellowish; front, cheeks and vertex rufapiceous, breast from the apex of the anterior coxae to the base of the abdomen, and the coxae, femora, and hind tibiae honey-yellow; tarsi whitish at base, the base of the tergum obscurely marked with paler. Elytra and wings whitish-hyaline, smoky at base and slightly clouded at apex. Marginal nervure brown, the others nearly concolorous. Antennae soiled honey-yellow. Length 3½ mm.

"Described from one female taken at Lancaster, N.Y., July 4, 1888."

Type in the collection of Iowa State College, Ames, Iowa.

Brachypterous form:

Structure: First segment of antennae slightly more than half as long as second; front about twice as long as wide, widest near apical third, slightly narrowed toward each end, more so toward base, tricarinate but median carina not too distinct; crown about as wide as long, carinae indistinct; elytra almost as wide as long, apices almost truncate, outer angles broadly rounded, veins indistinct, not reaching apices.

Color: General color fulvous, scutellum, femora and dorsum of abdomen often darker; pronotum and apices of elytra with a fairly broad white band.

Genitalia: In lateral view pygofer of ♂ more or less triangular, caudal margin with a V-shaped notch; lateral process about as broad as long; median process twice as long as lateral, sides almost parallel, apex more or less bifid; aedeagus very long and slender, curved ventrally, with one long, retrorse, slender process on dorsal margin at apex about half as long as shaft; styles narrowing and curving caudally; anal segment with a pair of short, heavy processes. In ventral view styles widest near middle, apices narrowed, long, incurved, overhanging; median processes widest near outer third, rounded notch on outer margin near outer third, apices

rounded, narrowed, directed out, then in; lateral processes wider than long, rounded at apices.

Holomorphotype ♂, allomorphotype ♀, 9 ♂ and 17 ♀ paramorphotypes, Fredonia, N.Y., July 21, 1946, R. H. Beamer; other paramorphotypes: 10 ♂ ♂ and 2 ♀ ♀, Peck's Pond, Pa., August 20, 1946, R. H. Beamer; 1 ♀, Heart Lake, N.Y., July 30, 1946, R. H. Beamer; 1 ♀, Morris, Manitoba, August 10, 1937, R. H. Beamer; 1 ♀, Malone, N.Y., July 29, 1946, R. H. Beamer; 2 ♀ ♀, Barberton, Ohio, July 8, 1936, L. J. Lipovsky; 1 ♀, Summit Co., Ohio, July 9, 1937, L. J. Lipovsky.

Types in Snow Entomological Collections.

A study of the male holotype of **Pissonotus crawfordi** Metcalf shows it to be a synonymy of **Pissonotus basalis** Van Duzee.

The Genus **Pissonotus**, Van Duzee.

Pissonotus Van Duzee, Bull. Buff. Soc. Nat. Sci., p. 236, 1897.

"Head narrower than the pronotum; vertex hardly prominent before the eyes; front narrow above, much expanded below, the sides arcuated, median carina forked about one third its length below the apex of the head, the two branches subparallel, closely approximated for most of their length. Thorax broad across the middle, convex, narrowed anteriorly; pronotum nearly straight across the hind edge, lateral carinae rather widely divergent at their apex a little incurved, hardly attaining the posterior edge.

"This genus seems to be intermediate between **Megamelus** and **Dicranotropis. P. marginatus** and its allies are highly polished little insects, broadest across the base of the elytra which in the brachypterous examples are small, truncate behind, smooth and polished with the nervures nearly obsolete, and the scutellum is unusually small. **P. basalis** has a large scutellum and has much the appearance of a **Kormus**, but the lateral carinae do not follow the posterior curve of the eyes and the front is much wider below with its median carina distinctly forked some ways below the apex of the head. **P. aphidioides** and its allies are dull brown insects widest across the abdomen, at least in the brachypterous examples which alone are known to me, giving them a strong resemblance to some of the subterranean plant-lice near **Rhizobius.** All the species have the apex of the front pale, and a broad black band crosses the clypeus and the anterior and intermediate coxae. Some of the species, especially **brunneus**, bear a strong resemblance to members of the genus **Dicranotropis**, and it may be necessary to modify that genus so as to include them when their winged forms are known. For the present these may be distinguished by having a broader front with the forks of its median carina closely approximated below the apex of the head. The brachypterous forms of **brunneus, aphidioides** and their allies have strong pale elytral nervures.

"The type of this genus is **Pissonotus marginatus.**" To the above description should be added some general characteristics of the male genitalia such as a long, narrow, almost parallel-sided, aedeagus in lateral view, usually with some retrorse processes on the dorsal margin; styles in ventral view usually with margins sinuate and with rounded, overhanging apices, supplemented by some form of median processes arising on pygofer ventrad

to style opening and often with some form of lateral processes flanking the bases of these.

KEY TO SPECIES OF PISSONOTUS (PISSONOTUS)

1 Veins of elytra plainly extending to hind margin 2
Veins of elytra not plainly extending to hind margin 9
2(1) With two distinct, round, black, dots in fovae of crown 3
Without two distinct, round, block dots in fovae of crown 4
3(2) In ventral view lateral processes of pygofer of ♂ at least twice as long as wide ..... **frontalis** (Crawf.) (9)
In ventral view lateral processes of pygofer of ♂ about as wide as long ..... **exiguus** n. sp. (10)
4(2) Veins of elytra lighter in color than membrane 5
Veins of elytra concolorous with membrane 6
5(4) Clypeus spotted with light ..... **albovenosus** Osb. (11)
Clypeus not spotted with light color ..... **brunneus** Van. D. (12)
6(4) General body color pitchy black, elytra dark rufous 7
General body color light red through dark brown 8
7(6) Genital capsule of male with large ventral U-shaped flap longer than wide ..... **niger** n. sp. (13)
Genital capsule of male with short U-shaped flap, not more than half as long as wide ..... **nigriculus n. sp. (14)**
8(6) Body usually light brown; dorsum of abdomen with rows of pustules; basal segment of antennae light **4-pustulatus** (Van D.) (15)
Body dark reddish brown, without pustules; basal segment of antennae black ..... **rubrilatus** n. sp. (16)
9(1) With distinct white band on both hind margin of pronotum and elytra 10
Without distinct white band on both hind margin of pronotum and elytra 15
10(9) Basal segment of antennae stramineous 11
Basal segment of antennae brown or black 12
11(10) Head and usually anterior half of pronotum much darker in color than remainder of body ..... **guttatus** Spooner (17)
Head and anterior half of pronotum same color as body ..... **aquilonius** n. sp. (18)
12(10) Frontal carinae and metathorax marked with white ..... **albivultus** n. sp. (19)
Frontal carinae and metathorax not marked with white 13
13(12) With distinct white, transverse band on apex of clypeus ..... **agrestis** n. sp. (20)
Without distinct white, transverse band on apex of clypeus 14
14(13) Bases of legs and venter yellow, never white; aedeagus in lateral view larger apically than at base; four processes on dorsum of aedeagus near apex ..... **merides** n. sp. (21)
Legs practically white; aedeagus in lateral view widest at base with two processes near apex ..... **paludosus** n. sp. (22)
15(9) Basal segment of antennae black 16

Basal segment of antennae not black 19

16(15) In ventral view median processes of ♂ pygofer as long as or longer than styles ..... **lactofascius** n. sp. (23)
In ventral view median processes of ♂ pygofer not over one-half as long as styles 17

17(16) In ventral view styles of ♂ ♂ narrowed and bluntly pointed on apical fourth; median processes of pygofer about one-half as long as styles ..... **binotatus** Spooner (24)
In ventral view styles broad and rounded on apices; median processes one-fourth as long as styles 18

18(17) Long apical process on aedeagus bifid ..... **delicatus** Van D. (25)
Long apical process on aedeagus not bifid but expanded blade-like ..... **delicatus melanurus** Van. D. (26)

19(15) Basal segment of antennae more than two-thirds as long as second ..... **delicatus** Van. D. (25)
Basal segment of antennae less than two-thirds as long as second 20

20(19) Elytra with sétae-bearing tubercules on veins 21
Elytra without setae-bearing tubercules on veins 22

21(20) Aedeagus with 2-3 tooth-like processes on each side near apex ..... **dentatus** n. sp. (27)
Aedeagus without tooth-like processes on each side near apex ..... **piceus** Van. D. (28)

22(20) Body dark brown with broad longitudinal light stripe on dorsum of abdomen ..... **dorsalis** Van. D. (29)
Body reddish, without broad longitudinal stripe on dorsum of abdomen ..... **marginatus** Van. D. (30)

9. **Pissonotus (Pissonotus) frontalis** (Crawford)

Dicranotropis frontalis Crawford, David L., Monograph Delphacidae, p. 597, pl. 46, fig. 1, 1914.

Brachypterous form:

This species was described from one brachypterous pair, the male from Claremont, California, and the female from Oregon (Baker). The female was designated holotype and is in the U.S. National Museum and the male is in the collection of Pomona College, Claremont, California. Unfortunately this pair represents two species. The male belongs to the following new species, **P. exiguus.** Crawford's original description follows:

"Length of body, 2.6 mm.; width of vertex, 0.22; width of frons, 0.27; antennae I, 0.18, II, 0.32. General color brown; abdomen brown, with light blotches, lighter at base elytra light brown, veins light; scutellum brown, pronotum dirty white with brown blotches; vertex dirty white with a black spot in each fovea; frons light brown with several transverse white bands, as in **aphidioides;** clypeus black; forecoxae black, femora and tibiae light brown striated with black.

"Somewhat similar to **aphidioides.** Head short; vertex weakly carinate, rather broad in female, as broad as long, but in male slightly longer than broad; frontal carina forked well down from apex of head, indistinct on

apex; antennae as long as frons, I half as long as II. Lateral carinae of pronotum disappearing near hind margin. Hind tibia longer than femora (one abnormal tibia has three lateral spines); calcar more than half as long as basal tarsus, margin finely dentate. Male genitalia in general similar to **bakeri**, but with genital styles sinuate, clavate-spatulate at tip; pygofers at base of styles with one pair of short, rounded processes; anal tube produced ventrad into a pair of very long, acute processes, extending almost to base of styles."

This description fits very well except where he states "but in the male slightly longer than broad."

This is the character which helps separate this species from **Pissonotus exiguus**, n. sp.

Genitalia: In lateral view pygofer of ♂ much wider in middle than at either end, rounded posterior margin broken by the large lateral process; aedeagus very long and slender, curving ventrally, sides almost parallel on basal half, slightly narrowing on outer third to sharp apex, with from 3-4 slender retrorse processes arising on dorsal margin and left side of outer half; anal segment with pair of sharp, stout processes. In ventral view styles widest near apices, narrowing slightly to more or less bifid apices; median processes broadly rounded, extending dorsally to tips of styles; lateral processes of pygofer twice as long as wide with rounded apices.

Holotype ♀, No. 15980, in U.S. National Museum.

Macropterous form:

Like brachypterous form but head and thorax darker brown, and flight wings fully developed. Elytra extending about one-third their length beyond tip of abdomen, semihyaline, veins concolorous with membrane.

Holomorphotype ♂, allomorphotype ♀, Niles Canyon, Alemeda Co., Calif., June 13, 1917, W. M. Giffard; paramorphotypes: 1 ♂ and 1 ♀, Niles Canyon, Calif., May, 1916, W. M. Giffard; 1 ♀, same place and collector, July, 1916; 4 ♂♂ and 1 ♀, Santa Cruz Co., Calif., June 7, 1917, W. M. Giffard; 2 ♀♀, Santa Cruz Co., Calif., June 22, 1921, W. M. Giffard.

Types and paramorphotypes in collection of Calif. Acad. of Sci.; paramorphotypes in Snow Entomological Collections.

Material studied (Brachypterous): Over 100 specimens from Alemeda, Santa Clara, Santa Cruz, San Joaquin, San Mateo and Contra Costa Counties, Calif., collected by W. M. Giffard.

10. **Pissonotus (Pissonotus) exiguus** n. sp.

Brachypterous form:

Resembles **Pissonotus frontalis** but smaller, the crown longer than wide

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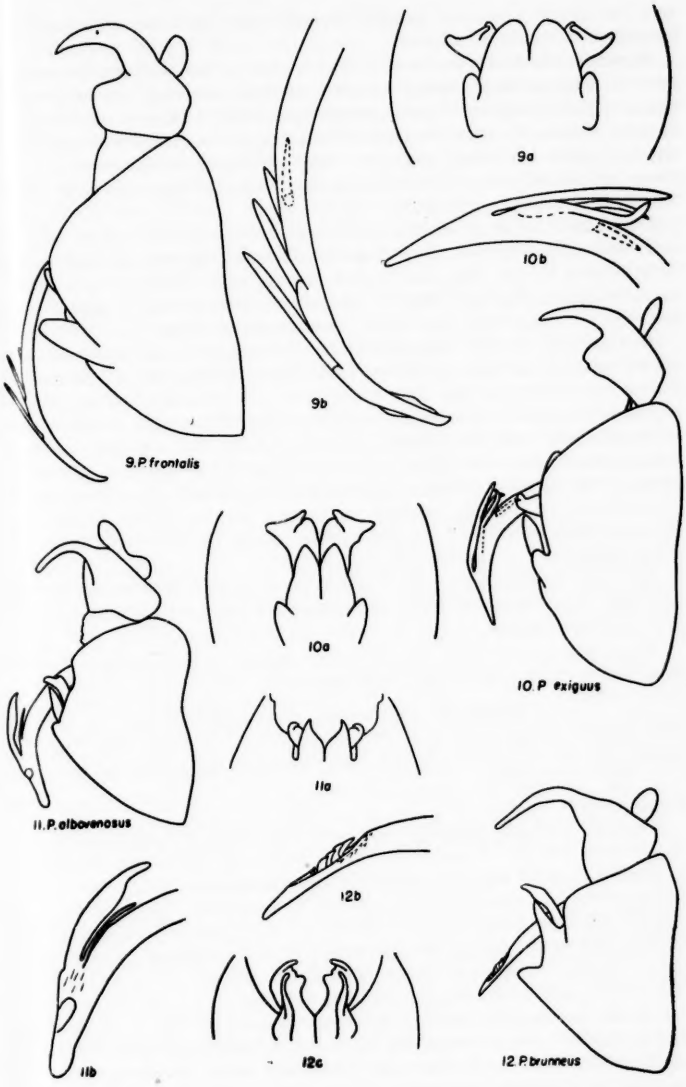
PLATE III

9 P. **(Pissonotus) frontalis** (Crawford), lateral view of ♂ genital capsule; 9a, ventral view of styles and processes in position; 9b, lateral view of aedeagus.
10 P. **(Pissonotus) exiguus** n. sp., lateral view of ♂ genital capsule; 10a, ventral view of styles and processes in position; 10b, lateral view of aedeagus.
11 P. **(Pissonotus) albovenosus** Osborn, lateral view of ♂ genital capsule; 11a, ventral view of styles and processes in position; 11b, lateral view of aedeagus.
12 P. **(Pissonotus) brunneus** Van Duzee, lateral view of ♂ genital capsule; 12a, ventral view of styles and processes in position; 12b, lateral view of aedeagus.


9a
10b
9b
9. P. frontalis
10a
10. P. exiguus
11a
11. P. albovenosus
12b
11b
12c
12. P. brunneus

and the lateral processes on male pygofer only about as wide as long. Length ♂ 2.2 mm.; ♀ 3.2 mm.

Structure: Second segment of antennae twice as long as first; front about twice as long as wide, slightly narrowed toward each end, carinae distinct; crown slightly longer than wide, rounded in front, carinae present but indistinct; apices of elytra truncate with corners rounded, extending on to second visible abdominal segment, veins of elytra conspicuously raised above membrane, attaining hind margin; abdomen set with fine white hairs, about their length apart.

Color: General body color dark brown; legs darker with tarsi whitish; antennae reddish brown, basal segment often darker than second; vertex light reddish brown, with two distinct, round, dark dots in fovae; clypeus more or less dark, with narrow, whitish transverse line at apex; elytra semi-hyaline, brownish, with veins prominent and white.

Genitalia: In lateral view pygofer of ♂ broadly rounded caudally with lateral process forming a distinct tooth below middle of caudal margin, this tooth slightly longer than wide; aedeagus with margins subparallel on basal half, strongly narrowed on outer half to sharp apex, dorsal margin of outer third with 3-4 slender processes about half as long as shaft; anal segment with a pair of strong processes, about as long as segment. In ventral view styles widest near apices, more or less avicephaliform; median processes widest at base, tapering to broadly pointed apices which reach to outer third of styles; lateral processes about as wide as long, rather sharp pointed.

Holotype ♂, allotype ♀, 19 ♂ and 6 ♀ paratypes, Potrero, Calif., July 21st, 1947, R. H. Beamer; 1 pair paratypes, San Diego Co., Calif., April 22, 1913, E. P. Van Duzee.

Types and paratypes in Snow Entomological Collections; paratypes in collection of California Academy of Science.

11. **Pissonotus (Pissonotus) albovenosus** Osborn

Pissonotus albovenosus Osborn, Herbert, Jour. Dept. Agr. Porto Rico, 13, p. 110, 1929 (note). (Nom. nud.).
Pissonotus albovenosus Osborn, Herbert, Sci. Surv. Porto Rico and Virgin Islands, 14, p. 247, 1935, fig. 68.

Brachypterous form:

"Robust, vertex longer than pronotum with prominent carinae and deep fovae; three carinae of pronotum and scutellum strong; elytra reaching on to basal abdominal segment, apical border broadly rounded; frontal carinae strong; clypeus somewhat tumid, polished. **Genitalia:** Female with broad pygofer reaching nearly to tip of ovipositor, male pygofer opening circular, open below, with margin and processes of anal segment paralleling the inner margin; diaphragm broad emarginate; armature concealed; styles short, blunt, polished; aedeagus slender, tapering.

"Dark fuscous, with carinae of vertex and front, carinae of pronotum and scutellum, postero-lateral border of mesonotum, veins and hind margin of elytra, a median series and some short lines on fourth segment and fifth segment of abdomen and border of last segment of abdomen whitish. A black bar across clypeus and cheek.

"Length: Female, 2.75 mm.; male, 1.75 mm.

"Described from fourteen specimens. Thirteen females (holotype and paratypes) and one male from Cameron, La., Aug. 14-28 and June 20-30, 1905, J. S. Hine (collector) and one male (paratype) collected at Rio Piedras, P. R., Feb. 9, 1930 (H. Osborn). A specimen from 'Jamaica, L. Id.' seems also to belong here but lacks the short white bars on base of front.

"The name **Pissonotus albovenosus** was used in my article on Porto Rican Homoptera under the impression that the description had been printed, but no reference to such description was found and Doctor Dozier informs me that his manuscript, including this species, has not been printed. The name **albovenosus** has been retained since it seems to involve less chance of confusion."

Genitalia: In lateral view pygofer of ♂ quite rounded caudally, almost no evidence of the lateral process so striking in other species; aedeagus slender, widest near apex with two retrorse processes on dorsal margin just before tip, first process about half as long as aedeagus and half as wide, the second less than half as wide and about two-thirds as long as first; anal segment with two long, almost parallel-sided processes with rounded apices. In ventral view styles widest near outer third, apices rounded, more or less avicephaliform; median processes wider and longer than styles, rapidly narrowed on inner margin near outer half to sharp apices; lateral processes not visible.

Numerous specimens studied from southern California, through Texas, Florida, Maryland, Connecticut and New Hampshire.

Macropterous form:

Like the brachypterous form, but body much darker brown, and with fully developed flight wings. Wings hyaline, veins darker and set with dark spine-bearing tubercles.

Holomorphotype ♂ and allomorphotype ♀, Brownsville, Texas, Dec. 29, 1945, R. H. Beamer; paramorphotypes: 4 ♂♂ and 4 ♀♀, Hidalgo, Texas, Dec. 28, 1945, R. H. Beamer; 1 ♂ and 1 ♀, Aransas Pass, Texas, Jan. 2, 1946, R. H. Beamer; 1 ♂, Harris Co., Texas, August 13, 1928, R. H. Beamer; 1 ♀, Norfolk, Va., Sept. 4, 1943, R. H. Beamer; 1 ♂, Sanford, Fla., March 11, 1947, L. D. Beamer; 1 ♂, Brownsville, Texas, June 29, 1938, R. I. Sailer.

Morphotypes and paramorphotypes in Snow Entomological Collections.

This species is taken commonly on **Lygodesmia grandiflora** (Nutt.).

12. **Pissonotus (Pissonotus) brunneus** Van Duzee

Pissonotus brunneus Van Duzee, E. P., Bull. Buff. Soc. Nat. Sci., 5, p. 190, 1894. (Listed). (Nom. nud.).
Pissonotus brunneus Van Duzee, E. P., Bull. Buff. Soc. Nat. Sci., 5 pp. 239, 1897.
Pissonotus divaricatus Spooner, Canadian Ent., 44, p. 236, 1912, (new syonymy).

Brachypterous form:

"Allied to **P. aphidioides** but much smaller. Color piceous brown tinged with rufous on the front; breast soiled yellowish white, marked by the usual broad piceous band which crosses the clypeus and curving backward on either side covers the anterior and intermediate coxae and terminates in a cloud on the postpleura. Carinae paler than the adjacent

surface, narrow apical margin of the front and outer edge of the cheeks whitish. Elytra fuscous with prominent whitish nervures. Disc of the tergal segments sometimes paler and there may be a longitudinal row of pale spots, more or less continuous, on either side of the middle of the venter, edge of the plates and a line on the oviduct pale. Antennae brown, the basal joint black. Eyes edged with pale. Length 2½ mm.

"New York. Described from six female examples, four taken near Buffalo in September, and two from New York City taken by Mr. E. B. Southwick in June. One of the latter is unusually dark with the pale markings much reduced in extent and the legs black.

"Superficially this insect resembles **Phyllodinus nervatus** but the head is narrower than the pronotum, the legs are not strongly flattened, the cheeks are narrower toward their apex and the lateral carinae of the pronotum do not reach the hind margin."

Genitalia: In lateral view pygofer of ♂ almost triangular, caudal margin with a very deep excavation which leaves a strong tooth at its ventral side; aedeagus about twice as wide at base as width just before apex; anal segment with pair of sharp, very long, slender, ventrally pointing, processes. In ventral view styles narrowed at base, widest near outer third, rounded and narrowed on apices; median processes of pygofer widest at base, narrowed to sinuate outer half, ending just before apices of styles; lateral processes practically absent.

Lectotype ♀, top specimen of three mounted on same pin, Grand Isd., N.Y. 9-11-92, E. P. Van Duzee. (Oman, Iowa State College Jour. Sci., Vol. 21, No. 2, Jan. 1947, p. 217.). Van Duzee specimens in collection of Iowa State College.

Allotype ♂ and 5 ♂ parallotypes, Storrs, Conn., August 5, 1946, R. H. Beamer; other parallotypes: 1 ♂, same place and collector, August 3, 1946; 3 ♂♂, same place and collector, August 4, 1946; 2 ♂♂, same place and collector, August 15, 1946; 1 ♂, Danbury, Conn., August 16, 1946, R. H. Beamer.

Allotype and parallotypes in Snow Entomological Collections.

Macropterous form:

Like the brachypterous form but with fully developed flight wings which are about one-third their length longer than abdomen and with carinae of dorsum usually much darker.

Holomorphotype ♂, and 1 ♂ paramorphotype, Storrs, Conn., August 2-3, 1946, R. H. Beamer; allomorphotype ♀, Plymouth, Mass., July 15, 1934, M. W. Sanderson; other paramorphotypes: 1 ♀, Barberton, Ohio, July 8, 1936, L. J. Lipovsky; 1 ♂, Old Ocean, Texas, January 3, 1946, R. H. Beamer; 2 ♂♂, Holland, N. Y., July 22, 1946, R. H. Beamer: 1 ♂, August 16, 1 ♂, August 23, Barberton, Ohio, 1936, L. J. Lipovsky; 2 ♂♂, Tallahassee, Fla., March 7, 1947, R. H. Beamer and L. D. Beamer; 1 ♂, Ponce de Leon, Fla., March 7, 1947, R. H. Beamer; 1 ♀, Arlington, Va., August 24, 1946, R. H. Beamer; 1 ♀, Cherokee Co., Kansas, Sept. 18, 1945, R. H. Beamer; 1 ♂, Raleigh, N.C., August 31, 1946, R. H. Beamer; 1 ♂ Peck's Pond, Pa., August 20, 1946, R. H. Beamer, 1 ♂, Summit Co., Ohio, July 9, 1937, L. J. Lipovsky.

Types in Snow Entomological Collections.

Additional material studies: About 300 specimens were studied from the following localities: (Alabama) Semmes; (Connecticut) Storrs, New Haven, Mystic; (Florida) Lamont, Sanford, Jacksonville, Daytona, Hilliard; (Illinois) Urbana, Elizabethtown, Metropolis, Havana, N. Milford; (Iowa) Ames; (Kansas) Douglas Co., La Cygne, Cherokee Co., Welda, Leavenworth; (Louisiana) Ramsey; (Maryland) Piney Point, Branchville, Plummers Id., Ashtown; (Massachusetts) Plymouth, Watertown; (New Hampshire) Durham; (Mississippi) Meridian, Port Gilbert, Vicksburg; (New York) Holland, Lancaster, Elba, Ithaca; (North Carolina) Chapel Hill, Raleigh; (Ohio) Barberton, Summit Co., Rome, Dayton, Columbus; (Pennsylvania) Peck's Pond, Ashland; (Texas) Dallas, Old Ocean, Benchley; (Virginia) Arlington, Woodbridge, Bluemont; (Washington, D.C.); (Wisconsin) Osceola.

Pissonotus divaricatus Spooner 1912, is suppressed as a synonym of **Pissonotus brunneus** Van Duzee 1897, on the basis of the following note taken from Beamer's records: "August 24, 1946, Oman and Beamer cleared and studied the macropterous male of the type of **P. divaricatus** Spooner. It is a synonym of **P. brunneus** Van Duzee."

13. Pissonotus (Pissonotus) niger n. sp.

Brachypterous form:

Resembles **Pissonotus brunneus** but slightly larger, veins of elytra concolorous with membrane and venter of genital capsule with a large open flap. Length ♂ 2.4 mm.; ♀ 2.9 mm.

Structure: Basal segment of antennae one-half as long as second; front about twice as wide as long at greatest width, slightly tapered toward each end, carinae distinct; crown slightly longer than wide, widest at apex; elytra almost truncate, corners rounded, coriaceous, veins only slightly raised above membrane, continuous to hind margin; abdomen set with fine white hairs, about their length apart; genital capsule of male with large, U-shaped flap located ventrally.

Color: General body color pitchy black; carinae of vertex stramineous; basal segment of antennae and sometimes base of second segment dark, nearly black, remainder of second segment lighter; legs dark brown, to stramineous.

Genitalia: In lateral view pygofer of male narrowed on dorsal margin, caudal margin with huge, blunt tooth at middle and long slender edge of flap at ventral corner; aedeagus widest at base, almost parallel-sided to outer third where dorsal margin sharply converges to apex, with two slender retrorse processes on dorsal margin beyond middle; anal segment with a pair of very long slender processes. In ventral view pygofer with median flap, almost square in shape with outer margin made up of four lobes, another pair of rounded lobes and an inner pair of smaller ones; styles widest near broadly rounded, overhanging apices; median processes widest near middle with a sharp notch on outer margin at this point, then narrowed and curved into rounded apices.

Holotype ♂, allotype ♀, 7 ♂ and 9 ♀ paratypes, Orland Park, Ill., July 13, 1946, R. H. Beamer; other paratypes: 5 ♂♂ and 3 ♀♀, Storrs,

Conn., August 15, 1946, R. H. Beamer; 1 ♂, Danbury, Conn., August 16, 1946, R. H. Beamer; 1 ♂, Dolson, Ill., July 24, 1936, Delong and Mohr; 1 ♂, Paxton, Ill., July 30, 1916; 1 ♂ and 1 ♀, Chittenango, N.Y., July 25, 1946, R. H. Beamer; 2 ♀♀, Douglas Lake, Mich., August 23, 1937, R. H. Beamer; 1 ♀, Mafeking, Manitoba, August 3, 1937, R. H. Beamer; 2 ♀♀, Deepdale, Manitoba, August 1, 1937, R. H. Beamer; 2 ♀♀, and 1 ♂ Keld, Manitoba, August 8, 1937, R. H. Beamer; 3 ♀♀, Swan River, Manitoba, August 2, 1937, R. H. Beamer; 1 ♂, Onarga, Ill., July 13, 1946, R. H. Beamer; 2 ♀♀ Douglas Lake Mich., Aug. 8, 1937, R. H. Beamer.

Types and paratypes in Snow Entomological Collections and paratypes in Illinois Natural History Survey Collection.

Macropterous form:

Like the brachypterous form except with flight wings developed which extend about one-third their length beyond the abdomen and the tip of the scutellum light in color.

Holomorphotype ♂, Keld, Manitoba, August 8, 1937, R. H. Beamer.

Type in Snow Entomological Collections.

14. **Pissonotus (Pissonotus) nigriculus** n. sp.

Brachypterous form:

Resembles **Pissonotus niger** except much smaller and males lack the large flap on venter of genital capsule. Length ♂ 1.7 mm; ♀ 2.1 mm.

Structure: Basal segment of antennae about one-half as long as second segment; front about twice as long as wide, widest just before apex, narrowed toward each end, distinctly tricarinate; crown longer than wide, apex widest and rounded, carinae discernible but not distinct; elytra broadly rounded, covering first abdominal segment, veins indistinct; dorsum of abdomen sparsely set with short, white hairs.

Color: General body color deep pitchy black throughout; carinae of crown varying from light brown to black; basal segment of antennae black, second segment lighter; legs more or less dark; venter including clypeus and clypellus black.

Genitalia: In lateral view pygofer of male extended on posterior margin into a broad tooth just below median line; aedeagus widest at base, sides almost parallel to slightly beyond middle, then evenly narrowed to fairly sharp apex, shaft with several thin, retrorse processes, some of them about as long as median width of shaft, located in region of constriction; anal sharp apex, shaft with several thin, retrorse processes, some of them about segment with a pair of very long slender processes. In ventral view styles widest near base, slightly narrowed and twisted to broadly rounded, over-

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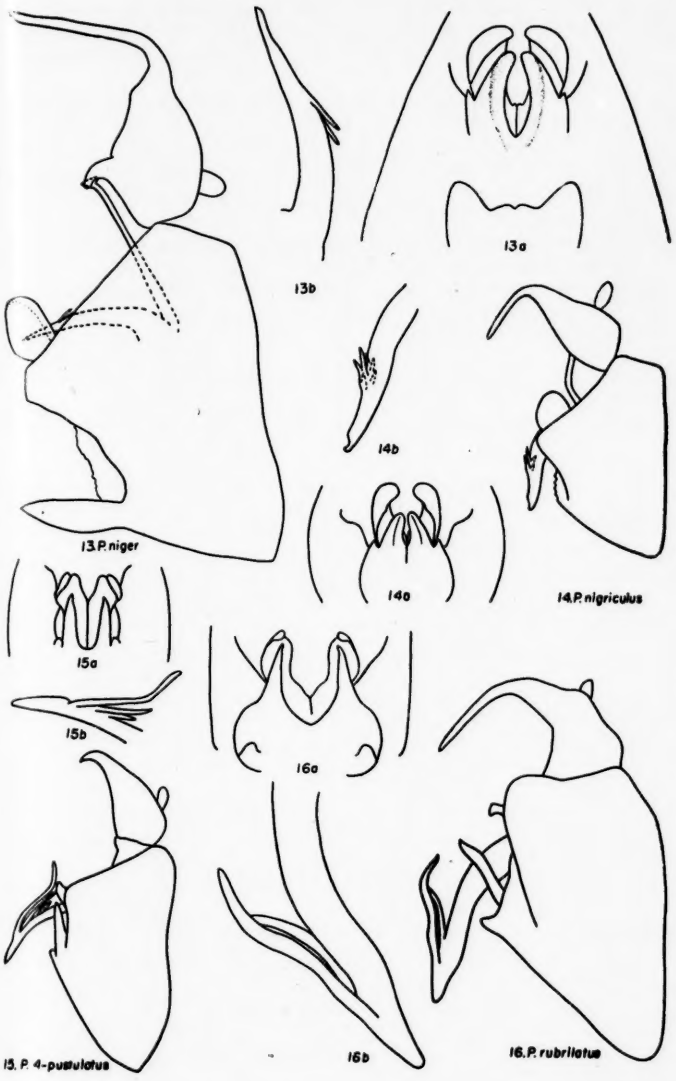
PLATE IV

13 P. **(Pissonotus) niger** Van Duzee, lateral view of ♂ genital capsule; 13a, ventral view of styles and processes in position; 13b, lateral view of aedeagus.
14 P. **(Pissonotus) nigriculus** n. sp., lateral view of ♂ genital capsule; 14a, ventral view of styles and processes in position; 14b, lateral view of aedeagus.
15 P. **(Pissonotus) 4-pustulatus** (Van Duzee), lateral view of ♂ genital capsule; 15a, ventral view of styles and processes in position; 15b, lateral view of aedeagus.
16 P. **(Pissonotus) rubrilatus** n. sp., lateral view of ♂ genital capsule; 16a, ventral view of styles and processes in position; 16b, lateral view of aedeagus.


13a
13b
14b
13.P.niger
14a
14.P.nigriculus
15a
15b
16a
15. P. 4-pustulatus
16b
16.P.rubrilatus

hanging apices; median processes widest at base, with sharp tooth on outer margin just beyond middle, sharply narrowed at this tooth to end in incurving more or less rounded apices just beyond widest portion of styles.

Holotype ♂, allotype ♀, 71 ♂ and 61 ♀ paratypes, Sanford, Fla., March 11, 1947, R. H. Beamer; other paratypes: 7 ♂♂ and 10 ♀♀, Sanford, Fla., March 11, 1946, L. D. Beamer; 2 ♂♂ and 5 ♀♀, Royal Palm State Park, Fla., March 16, 1947, R. H. Beamer; 2 ♀♀, La Belle, Fla., July 16, 1939, P. W. Oman; 1 ♀, Sanford, Fla., Feb. 22, 1921, E. D. Ball; 1 ♀, Sanford, Fla., April 25, 1926, E. D. Ball.

Types and paratypes in Snow Entomological Collections; paratypes in U.S. National Museum and collection of E. D. Ball.

The specimens taken by Beamer at Sanford, Fla., were collected inside a grove of large palm trees in deep shade. This grove was about 7 miles southeast of the city of Sanford.

(To be continued in the October issue)

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